



IMPERIAL INSTITUTE
OF
AGRICULTURAL RESEARCH, PUSA.

THE VETERINARY JOURNAL

A Monthly Review of Veterinary Science.

Editor for Great Britain and Ireland:—

FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.,
FORMERLY PROFESSOR IN THE ROYAL VETERINARY COLLEGE, LONDON.

Editor for Australasia:—

J. A. GILRUTH, D.V.Sc., M.R.C.V.S., F.R.S.E.,
DEAN OF THE VETERINARY FACULTY, UNIVERSITY OF MELBOURNE, AUSTRALIA.



OLD SERIES, VOLUME LXXI.
NEW SERIES, VOLUME XXII., 1915.

LONDON:
BAILLIÈRE, TINDALL AND COX,
8, HENRIETTA STREET, COVENT GARDEN.

LONDON:
BAILLIÈRE, TINDALL AND COX,
8, HENRIETTA STREET, COVENT GARDEN, W.C.

THE VETERINARY JOURNAL

JANUARY, 1915.

Editorial.

THE IMPORTANCE OF BEING CAUTIOUS.

GENIUS has been described as "an infinite capacity for taking pains." The veterinary surgeon who goes through a few years' practice without at some time or other becoming infected from live or dead subjects which he comes in contact with must be a genius of carefulness and possess a lucky star, or else a perfectly bacteria-proof epidermis. The daily life of practice necessitates putting our hands into dangerous, strange, and dark places, and it is no uncommon thing for us to come well within the range of infection many times in one day. That the personal danger is a real one is proved by the fact that not a few veterinary surgeons have died of anthrax, septicæmia, pyæmia, tuberculosis, &c. Only quite recently the death of an American veterinary surgeon (whilst in the full strength of manhood) from anthrax, after making a *post-mortem* on a diseased subject, has been notified, whilst not long ago a continental professor succumbed in the same way; and the death list in our own country is not wanting in examples of the kind.

Fortunately, the majority of infections which attack us do not prove fatal, but as we endure them they often cause us much restlessness and discomfort, if not actual pain. The prevalence of infection in our ranks is, we feel sure, by no means a negligible quantity. At a veterinary meeting we attended some time ago we were struck by the relation of instances of human contagion from the bacillus of swine erysipelas. If this phase of the question was fully discussed in regard to mange, ringworm, fungulosis, alopecia, accoucheur's eczema, pyæmia, and septi-

cæmia, we are of opinion that many similar instances would come to light among our members. As a matter of fact, it is very rare indeed for any of us to possess really whole skins, and every breach in the integument furnishes a port of entry for infection, whilst even an intact epidermis, if its surface is not kept free from the organisms of disease, will soon suffer.

From the exigencies of practice which frequently necessitate the performance of operations, where water is not clean and toilet requisites of any kind conspicuous by their absence, we suffer more than our friends of the medical profession, who can have the run of the house and the call of the dwellers therein or a capable and watchful nurse whilst conducting their work.

How often can we purify our arms or hands thoroughly after a rectal, vaginal, or uterine examination, and even if we manage this fairly well, how can we prevent the rolled-up underclothing at the biceps or beneath the armpit becoming soiled, contaminated, or flushed by the products of disease? We cannot always change our clothing at every operation of this kind, and frequently we spend an hour or two in finishing our round with our soiled linen still in contact with the skin of our arm.

In the case of *post-mortems* we feel sure that the most effective protection is the wearing of indiarubber gloves. These are liable to split or tear, and then a finger rent may be repaired by carrying a supply of finger stalls with us. Flexible collodion or hand varnish may help us if rents occur in other parts of the glove. We wonder whether *mastisol* (mentioned on p. 497 of THE VETERINARY JOURNAL for September, 1914) will be manufactured by our own chemists, and whether it will supersede collodion, which has its faults, and is not even now considered the best application for wounds received whilst conducting *post-mortems*. Some experts advise thorough cleansing of scratches and lesions with soap and water, afterwards putting on a few drops of alcohol and ether or acetic acid, then a light bandage and a finger stall, and say that only thus is it safe to conduct further *post-mortem* procedure.

We have recently seen an indiarubber armlet which will fit closely over the rolled-up linen on the arm, and surround the biceps muscle so tightly that it is impossible for any discharges or fluid to get beneath the armlet at the biceps. Such a contrivance seems very handy and practical. The protection

afforded by it ought to be very acceptable to the practitioner who values a whole skin and who wishes to be up to date hygienically. It is becoming more and more certain that washing of the hands and arms with antiseptics is not all that we need as a safeguard; perhaps because, although perfectly done, the method itself is imperfect, or else because it is so seldom that we are able to conduct the procedure perfectly.

The subject of this article is important to the thinking man, and even if all the trouble we take does not produce a proportionate recompense, we may, by observing due and proper care, travel through our professional life *sans peur et sans reproche*.

FOOT-AND-MOUTH DISEASE.

IN various important Continental States foot-and-mouth disease has often within recent years raged with great severity, and many cattle, sheep, pigs, and goats have been affected. At a time like the present, when large bodies of men and animals and vast quantities of stores and vehicles are on the move in these countries, and when measures against disease are likely to be slackly carried out or even in abeyance altogether, there is a likelihood that infection will spread largely, and that in the warm time of the year many cases of foot-and-mouth disease will occur. There is still some doubt as to all the agents capable of carrying infection, and whether horses, dogs, rabbits, rats, and birds can spread the disease; but all these creatures will be hurrying and scurrying over the areas affected by the war, and there will be ample opportunity for them to act as virus carriers. The factors for the occurrence of outbreaks of the disease in these isles would appear to be a good deal more prevalent and favourable than has been the case for many years, and it behoves all practitioners to be on the look-out for cases of the disease. More especially will the need for keenness arise when the military operations cease and men, horses, and stores begin to return to these shores. The difficulty in obtaining leather and its high price may lead to fresh supply markets being opened, and raw hides are known to carry infection. Cars and wagons used in transporting stock and stores ought to be far more frequently disinfected than is the case with us at present. On the Continent in times of peace this matter is well attended to, and scientific

papers are read on the subject and demonstrations given; but one hears and reads little of the matter here, and yet such procedure would seem to be specially indicated at this time.

To preserve our flocks and herds from disease and decimation, it is essential that an efficient force of well-organized veterinarians should remain at the service of the Board of Agriculture, for we feel absolutely sure that before very long there will be need for great activity as regards foot-and-mouth disease.

In America they have just had their fifth visitation in a period of forty-four years, but the organization and equipment of the Bureau of Animal Industry has soon enabled the authorities to stamp the disease out. The absolute necessity of its immediate extermination is fully realized, as once the disease gains headway great difficulties arise in its suppression.

SUSCEPTIBLE TO BRONCHITIS.

A LARGE number of farmers have complained to us this summer of the prevalence of bronchitis among Clydesdale colts, and are at a loss to explain the reason for it. The Clydesdale is a very slow-moving piece of mechanism, and when he gets anything he is slower letting go of it than a tight-fisted elder at camp meeting time. When bronchitis attacks a Clydesdale it elongates the palate and causes it to brush ever and anon across the face of the epiglottis, which brings the heaves to the surface, where they can be heard with perfect distinctness for two miles on a still night. The remedy is to reach down the colt's throat with a pair of tinner's shears and clip off the palate, in the meantime getting the nearest undertaker on the telephone. This is a simple home remedy and will not cost a cent if a man is quick on his feet.—*National Dairy Magazine*.

Selected Article.

ABSTRACT FROM A REPORT ON THE INFECTION OF CHILDREN WITH THE BOVINE TUBERCLE BACILLUS IN THE *BRITISH MEDICAL JOURNAL*.*

By A. PHILP MITCHELL, CH.M., M.D., F.R.C.S.

Ernest Hart Memorial Scholar; formerly McCunn Scholar in Surgery, British Medical Research Scholar, and Resident Surgical Officer, Royal Hospital for Sick Children, Edinburgh.

(From the Royal College of Physicians' Laboratory, Edinburgh.)

IN recent years the results of investigations on tuberculosis conducted by the British Royal Commission, the German Imperial Commission, and by many individual workers, have proved beyond a doubt the communicability of the bovine virus from animal to man.

While for the proof of this contention these investigators employed material obtained from human tuberculosis in its various forms, they were unable, owing to the small number of cases investigated, to define the extent and importance of the bovine infection in the commoner varieties of surgical tuberculosis affecting children. The subject of tuberculous cervical glands in children—a very frequent disease in Edinburgh—had received little attention, and this seemed to me a favourable one for investigation. The only way to obtain definite statistical evidence as to the relative frequency of the bovine and human types of infection was to undertake the examination of a large series of non-selected cases. Accordingly, I commenced such an inquiry at the beginning of 1911, and the special points of these investigations I wish to discuss here are:—

(a) Technique.

(b) Results of investigations—important relationship of clinical data and milk supply.

(c) Pathological considerations—relation between channels of infection and groups of glands involved.

(d) Channels of infection.

* Being an abstract of a thesis presented to the University of Edinburgh for the degree of Ch.M., and awarded a gold medal, July, 1913. The expenses of the research were defrayed from grants from the British Medical Association, the McCunn Trust, and the Carnegie Trust, for which I desire to express my thanks.

TECHNIQUE.

I have investigated seventy-two consecutive cases of tuberculous cervical glands in children; of these, thirty-eight resided in Edinburgh and thirty-four came from neighbouring country districts (within a radius of thirty miles). The material for this study has come to my hand without selection through the kindness of Mr. Harold J. Stiles and Mr. C. Balfour Paul. Almost without exception the material was removed at operations at the Royal Hospital for Sick Children, Edinburgh. In a few instances it was obtained from operations in private practice. I received it in sterile gauze from the operating theatre, and have been, in all cases, able to guarantee freedom from contamination with other tuberculous material. Clinical histories were personally recorded in each case in the hope that I might be able to detect some feature or features of distinction between the cases in which bovine and human types of tubercle bacilli were found.

I also endeavoured, in every suitable case, to establish the relationship between the incidence of tuberculous cervical glands and the drinking of tuberculous cows' milk. I only expected to be able to trace the disease to the milk when, after the onset of symptoms pointing to infection by way of the mouth, the cow or cows from which the milk had been obtained were still available for examination.

RESULTS OF INVESTIGATIONS—IMPORTANT RELATIONSHIP OF CLINICAL DATA AND MILK SUPPLY.

Experimental investigations of the relative frequency of bovine and human tubercle bacilli in tuberculous cervical adenitis have been reported by Paul H. Lewis, 15 cases; British Royal Commission on Tuberculosis, 9 cases; H. Burckhardt, 9 cases; W. Litterer, 11 cases; H. Weber, 5 cases; Park and Krumwiede, 54 cases; Oehlecker, 14 cases; German Imperial Health Board, 3 cases.

Of the cases investigated by Lewis, nine were due to the bovine bacillus and six to the human type. The average age of the patients giving the bovine type of bacillus was $8\frac{1}{2}$ years. The youngest was 18 months, and the oldest 19 years. The average age of the six patients suffering from infection with the human type of bacillus was $17\frac{2}{3}$ years, the oldest 32 years, and the youngest 8 years.

The British Royal Commission examined nine cases. It is a noteworthy feature that all the cases except one were over 6 years of age. Three cases contained the bovine bacillus; ages, $1\frac{2}{3}$, 7, and $7\frac{1}{2}$ years. Six cases contained the human bacillus; ages, $11\frac{1}{2}$, 6, 12, 4, and 7 years.

Litterer's series consisted of eleven cases, and resulted in the isolation of five cultures of the human type and six cultures of the bovine type. Ages not stated.

Burckhardt found one bovine case out of nine cases of tuberculous glandular processes in the neck. The ages were 28, 21, 18, 18, 17, 15, 15, 12, and 6. The youngest yielded the bovine culture.

Weber studied five cases, and isolated the bovine type of tubercle bacillus from all. The ages were $1\frac{1}{2}$, 2, 4, $6\frac{1}{2}$, and 8 years.

Park and Krumwiede examined a series of fifty-four cases; nine cases were obtained from adults (16 years and over), and were without exception due to the human bacillus; twenty-seven cases from children (5 to 16 years) resulted in the isolation of the human type from nineteen and the bovine type from eight; eighteen cases from children under 5 years, twelve were due to the bovine type and six to the human type.

Oehlecker investigated fourteen consecutive cases. Two were in adults, both infections being of the human type; twelve cases in children yielded four cultures of the bovine type.

German Imperial Health Board, in a general series of cases, reported three of primary cervical adenitis in children under 10 years, two of which were due to bacilli of the bovine type and one to the human type.

On reading these statistics it is obvious that a comparison of the results of the individual investigators is impossible, since the number of cases investigated at each age period has varied so much. The results are too fragmentary for any conclusions to be drawn. All the cases have not been consecutive, and the importance of investigating a large number of cases of primary tuberculous cervical adenitis affecting young children has not been sufficiently recognized. This is one of the special factors to be considered in explaining the outstanding differences presented by the results of my investigations as compared with those of other investigators.

TABLE I.—CLINICAL DATA REGARDING 72 CONSECUTIVE CASES OF TUBERCULOUS CERVICAL GLANDS IN CHILDREN.

Number and initial	Age: Years	Duration of illness	Milk supply	Previous health	Type
1. A. G.	1½	15 months	Unsterilized cows' milk	Healthy	Bovine
2. I. B.	9½	2 years	Breast-fed (8 months)	Glands followed measles	Human
3. D. R.	4	5 months	Breast-fed (11 months)	—	"
4. J. M.	2	14 "	Unsterilized cows' milk	—	Bovine
5. W. G.	1	6 "	Unsterilized cows' milk	Otitis media	"
6. D. W.	2½	2 "	Breast-fed (12 months)	—	"
7. D. F.	1¾	6 "	Unsterilized cows' milk	—	"
8. J. D.	1½	4 "	Unsterilized cows' milk	—	"
9. B. P.	9¼	1 year	Unsterilized cows' milk	Otitis media	"
10. G. L.	9	18 months	Breast-fed (6 months)	Glands followed scarlet fever	"
11. J. I.	3½	8 weeks	Unsterilized cows' milk	—	"
12. H. D.	5	3 months	Breast-fed (9 months)	Glands followed measles and scarlet fever	"
13. B. P.	1½	4 "	Unsterilized cows' milk	—	"
14. M. M.	8	10 "	Breast-fed (10 months)	Glands followed measles	"
15. J. M.	2	3 "	Breast-fed (8 months)	—	"
16. R. F.	2½	8 "	Breast-fed (6 months)	—	"
17. J. McB.	10	3 weeks	Unsterilized cows' milk	—	"
18. A. W.	4	6 "	Breast-fed (12 months)	—	"
19. W. B.	9	6 months	Unsterilized cows' milk	—	"
20. J. M.	5	6 weeks	Unsterilized cows' milk	Glands followed whooping-cough	"
21. M. S.	9	2 months	Unsterilized cows' milk	—	"
22. R. G.	11	16 "	Unsterilized cows' milk	—	"
23. M. F.	6	4 weeks	Breast-fed (8 months)	—	"
24. R. A.	1¾	7 "	Unsterilized cows' milk	—	"
25. W. H.	2	5 months	Breast-fed (6 months)	—	"
26. B. S.	2	2 "	Unsterilized cows' milk	—	"
27. M. J.	3½	2 "	Unsterilized cows' milk	—	"

Infection of Children with Bovine Tubercle Bacillus. 9

CLINICAL DATA REGARDING 72 CONSECUTIVE CASES OF TUBERCULOUS CERVICAL GLANDS IN CHILDREN—(Continued.)

Number and initial	Age : Years	Duration of illness	Milk supply	Previous health	Type
28. M. B.	6	3 months	Unsterilized cows' milk	—	Bovine
29. J. D.	4	7 "	Breast-fed (9 months)	—	"
30. J. S.	8	5 "	Unsterilized cows' milk	—	"
31. H. L.	4	4 "	Breast-fed (8 months)	—	"
32. T. C.	4	3 years	Unsterilized cows' milk	—	"
33. J. B.	4	8 months	Unsterilized cows' milk	—	"
34. J. G.	2½	4 "	Breast-fed (6 months)	Glands followed measles	"
35. C. H.	1½	2 weeks	Unsterilized cows' milk	—	"
36. E. A.	3½	7 months	Breast-fed (9 months)	—	"
37. J. McA.	4	12 "	Breast-fed (12 months)	Glands followed measles	"
38. P. McD.	1½	15 "	Unsterilized cows' milk	—	"
39. J. B.	7	3 "	Unsterilized cows' milk (father's byre)	—	"
40. J. L.	11	3 "	Breast-fed (8 months)	—	Human
41. R. G.	5	3 "	Breast-fed (6 months)	—	Bovine
42. E. L.	6	12 "	Breast-fed (9 months)	Had pleurisy when 1 year old	Human
43. A. E.	8	4 "	Breast-fed (12 months)	Glands followed measles	Bovine
44. M. F.	2½	18 "	Unsterilized cows' milk	Glands followed measles	"
45. C. S.	2	2 "	Unsterilized cows' milk	—	"
46. J. F.	3	2 years	Unsterilized cows' milk	Otitis media since 18 months old	"
47. E. C.	11	3 "	Breast-fed (12 months)	Measles	Human
48. W. S.	9	4 months	Unsterilized cows' milk	—	Bovine
49. W. S.	9	6 weeks	Breast-fed (9 months)	—	"
50. M. B.	3	6 months	Unsterilized cows' milk	—	"
51. J. H.	7	5 "	Breast-fed (15 months)	Glands followed measles and mumps	"
52. C. T.	5	6 "	Unsterilized cows' milk	—	"
53. B. F.	1½	1 week	Unsterilized cows' milk	—	"

CLINICAL DATA REGARDING 72 CONSECUTIVE CASES OF TUBERCULOUS
CERVICAL GLANDS IN CHILDREN.—(Continued.)

Number and initial	Age : Years	Duration of illness	Milk supply	Previous health	Type
54. J. M.	3	6 months	Unsterilized cows' milk	Glands followed measles	Bovine
55. T. H.	5 months	2 "	Breast-fed (5 months)	Tuberculous disease of mastoid since 3 months old	Human
56. R. D.	8	3 "	Unsterilized cows' milk	Glands followed typhoid fever	Bovine
57. W. L.	3½	6 "	Unsterilized cows' milk	—	"
58. P. C.	10 months	2 "	Breast-fed (3 months)	—	Human
59. A. M.	5½	3 "	Unsterilized cows' milk	—	Bovine
60. C. W.	2	2 "	Unsterilized cows' milk	—	"
61. J. P.	6½	2 years	Unsterilized cows' milk	—	"
62. M. M.	10	18 months	Unsterilized cows' milk	Glands followed tonsillitis	"
63. C. H.	3	1 year	Unsterilized cows' milk (father's byre)	—	"
64. M. McL.	1½	1 month	Unsterilized cows' milk	Glands followed tonsillitis	"
65. M. W.	7	6 weeks	Breast-fed (9 months)	—	"
66. M. W.	7	3 months	Unsterilized cows' milk	—	"
67. B. C.	10	8 "	Breast-fed (15 months)	—	"
68. W. L.	9 months	6 "	Unsterilized cows' milk	—	"
69. J. W.	12	2 years	Unsterilized cows' milk (father's byre)	Measles and whooping-cough	"
70. L. T.	12	2 months	Unsterilized cows' milk	—	"
71. M. C.	8	3 "	Unsterilized cows' milk	—	"
72. A. McD.	8	2 years	Breast-fed (9 months)	Glands followed measles	"

I found that out of a total of seventy-two cases in children, in sixty-five instances (90 per cent.) the bovine bacillus was present, and in seven cases (10 per cent.) the human bacillus.

I believe that these results can be verified by a careful consideration of certain clinical data, which have been personally gathered, such as age, family history, geographical relations, and the milk supply. A correct interpretation of the bacteriological findings is impossible without specially considering the

nature of the clinical data of the cases reported. The correlation between these factors has, I regret, frequently been overlooked by Continental workers.

The clinical data collected may be conveniently tabulated (see Table I).

CLINICAL DATA.

Age of Patients.

Age is a most important factor in such experimental inquiries. I reiterate that some investigators have apparently not recognized the importance of studying the disease in young children and the influence of age on the type of bacillus isolated.

I have tabulated the cases according to the age and type of infection to show the relative frequency of types at the various age periods:—

TABLE II.—AGES WITH TYPES OF TUBERCLE BACILLI FROM TUBERCULOUS CERVICAL GLANDS.

Age	Human	Bovine	Total
To 1 year	2	1	3
1 to 2 years	—	16	16
2 „ 3 „	—	8	8
3 „ 4 „	1	10	11
4 „ 5 „	—	4	4
5 „ 6 „	1	4	5
6 „ 7 „	—	5	5
7 „ 8 „	—	5	5
8 „ 9 „	—	5	5
9 „ 10 „	1	4	5
10 „ 12 „	2	3	5
	<hr/> 7	<hr/> 65	<hr/> 72

TABLE III.

Children 5 to 12 years of age :

Human bacilli	4
Bovine bacilli	30

Children under 5 years of age :

Human bacilli	3
Bovine bacilli	35

Grand total 72 cases

A most striking fact brought out is the high incidence of the disease in children under 3 years of age. This is not surprising when it is recalled that the large majority of children of this age are nourished in whole or in part on cows' milk. I find that, in my series of cases, 84 per cent. of the children 2 years of age and under have been fed with unsterilized cows' milk since birth. The correlation between this observation and that of the high

incidence of bovine cervical glandular tuberculosis during the same age period points wholly to the drinking of tuberculous cows' milk as the most probable source of infection. I contend that if in Edinburgh and district the number of cases of tuberculous cervical glands in children under 3 years of age is much above the normal, and if, in that same neighbourhood, a large proportion of the cows are affected with tuberculosis, and further, if it is usual to feed the children on unsterilized milk, then the increased incidence of tuberculous cervical glands in young children is probable evidence that the disease is due to the drinking of milk from tuberculous cows.

NOTES ON THE FAMILY HISTORY OF TUBERCLE IN CASES CONTAINED
IN TABLE I.

Case 9.—Brother, aged 6, died from generalized tuberculosis. Brother, aged 5, has tuberculous cervical abscesses. These developed three months after the first appearance of the patient's.

Case 19.—Sister, aged 6, died from tuberculous meningitis one month after the patient's glands were excised.

Case 22.—Sister, aged 8, has tuberculous cervical glands.

Case 23.—Brother, aged 2, had tuberculous abscess in neck eighteen months previous to onset of the patient's glands.

Case 25.—Brother, aged 3, had tuberculous cervical abscess in December, 1910, when the patient's glands were first noticed.

Case 26.—Brother, aged 18 months, died from tuberculous meningitis in 1909.

Case 32.—Sister, aged 2, had hypertrophied faucial tonsils removed one month after the patient's glands were excised. The tonsils I found to be tuberculous and harbouring the bovine type of bacillus.

Case 41.—Brother has tuberculous disease of humerus.

Case 43.—Brother, aged 6½, died from tuberculous disease of the spine.

Case 45.—Brother, aged 9, died from tuberculous meningitis. Sister, aged 5, had a leg amputated for tuberculous disease. Sister, aged 17, died from generalized tuberculosis, being primarily in the cervical glands.

Case 47.—Father died from pulmonary tuberculosis. Mother has enlarged cervical glands. Sister, aged 4, died from abdominal tuberculosis.

Case 51.—Sister, aged 12, has tuberculous glands in the neck. Brother, aged 8 months, died from tuberculous meningitis.

Case 55.—Mother has tuberculous disease of mastoid.

Case 57.—Sister, aged 10, had hypertrophied faucial tonsils removed three months before excision of her brother's glands. The tonsils were found to be tuberculous and to harbour the bovine type of bacillus.

Case 58.—Father treated for pulmonary tuberculosis during the last ten years.

Case 60.—Brother, aged 8, died from tuberculous meningitis three years ago.

Case 65.—Infant brother died from abdominal tuberculosis.

Case 68.—Brother had tuberculous cervical glands excised a year ago.

Case 71.—Sister, aged 2, had tuberculous cervical glands excised. They appeared at the same time as the patient's.

FAMILY HISTORY OF TUBERCULOSIS.

This has been carefully investigated in every case, with special reference to the existence of pulmonary tuberculosis in the parents and other members of the household. When such a focus exists in any family it must constitute a probable and most dangerous source of infection. In only three instances was a history of pulmonary tuberculosis occurring in the patient's family found; in one case the mother and in the other two the father. Each patient had been living for years in contact with a "consumptive" when the glands appeared.

In each of the three cases the human type of tubercle bacillus was isolated from the cervical glands. There was no history of pulmonary tuberculosis in the remaining four human cases.

As regards the bovine cases, it seems more than a coincidence that in not a single case was there a history of pulmonary tuberculosis in the various families. In sixteen cases (Nos. 9, 19, 22, 23, 25, 26, 32, 41, 43, 45, 51, 57, 60, 65, 68, and 71), however, one or more of the other children in the respective families were affected with various forms of surgical tuberculosis. Although these cases are fully recorded in Table I, I should like to draw attention to the milk supply in a few.

In Case 25, a brother, aged 3, had a tuberculous cervical abscess in December, 1910, when the patient's glands were first

noticed. I investigated the milk supply, and found that a cow with advanced tuberculosis of the udder had been removed for destruction in September, 1910. This cow had been in the byre for several months, and I have not the slightest doubt that its milk was responsible for these two cases of tuberculous cervical adenitis.

In Case 26, a brother, aged 18 months, died from tuberculous meningitis in 1909. The patient's glands appeared in December, 1910. The onset was acute. I found the milk was obtained from a byre situated just beyond the city boundary. I visited the byre, and the dairyman readily confessed that he had disposed in October, 1910, of a very tuberculous cow with the udder involved. The cow had been in the byre many months. The circumstantial evidence was likewise strong in this case.

In Case 32, a sister, aged 2, had tonsillotomy performed (one month after the patient's glands were excised) for hypertrophied faucial tonsils with no clinical evidence of cervical lymphatic tuberculosis, and from them I isolated the bovine type of tubercle bacillus. The family consisted of two children, who had been given plenty of unsterilized cows' milk to drink.

In Case 57, a sister, aged 10, had tonsillotomy performed (three months before the patient's glands were excised) for hypertrophied faucial tonsils with no clinical evidence of cervical lymphatic tuberculosis, and from them I isolated the bovine type of tubercle bacillus.

It seems to me a justifiable conclusion that, at any rate, in each of these sixteen families the children acquired the tuberculous disease from an infected milk supply.

MILK SUPPLY.

A consideration of the milk supply becomes of prime importance in a series of cases of glandular tuberculosis in children yielding such a high percentage of bovine infection. Whatever may be the case in other countries, the mode of feeding children in Britain, especially in Scotland, is such as to favour bovine infection. I have already stated that in my series 84 per cent. of the children 2 years of age and under were nourished from birth with unsterilized milk. That a large proportion of Scottish babies are bottle-fed, and that it is the exception rather than the rule to sterilize the milk are factors the significance and import-

ance of which have not been fully recognized by many investigators in other countries.

As evidence in favour of the view that the ingestion of tuberculous cows' milk is an important cause of surgical tuberculosis in children, I might record several cases in which the relationship of cause and effect appear to be obvious. The milk supply was investigated in every suitable case, and from many town and country expeditions I have gained much valuable information regarding the existing conditions under which milk is produced and sold. The opportunities for tracing bovine infection are much greater in small communities and rural districts than in large cities. It is the country practitioner who could gather together much valuable information. As examples of what not infrequently happens, let me instance the following:—

(a) A country child, aged 9 months, whom Mr. Stiles operated on a few months ago for multiple osseous tuberculosis, proved to be a very instructive case. The father and mother and the other children were all healthy. The milk was obtained from a small dairy farm in the village. Investigating the milk supply of this patient, I discovered that of the six cows in the byre two had tuberculous udders, with the milk from both teeming with tubercle bacilli.

(b) There was brought, a short time ago, to the surgical out-patient department of the Royal Hospital for Sick Children, Edinburgh, a child, aged 1 year and 5 months, suffering from multiple osseous tuberculosis. I elicited from the mother the following appalling history: The baby had been bottle-fed with milk obtained from a small dairy farm. The mother had been informed by the child's grandfather, who worked on the farm, that soon after the birth of the child one of the cows had "gone wrong." He told how the animal had rapidly wasted, become so weak that it was unable to stand; it was actually milked lying on the ground, and this milk was used for human consumption! By this time it was thought expedient to call in a veterinary surgeon, who, finding the animal suffering from generalized tuberculosis with marked involvement of the udder, at once ordered its destruction and burial.

In both cases the bovine type of bacillus was isolated.

(c) C. A., aged 6. Swelling appeared suddenly on right side of the neck (upper carotid region) about the end of November,

1912. Abscess rapidly formed. Pus swarming with tubercle bacilli. Sterno-mastoid muscle extensively involved by the tuberculous process. Right faucial tonsil slightly enlarged and showed a dirty surface. The patient usually had unsterilized cows' milk at every meal. Daily supply of milk to the house about two gallons, and obtained from dairy farm where twenty cows were kept. Byre visited in December, 1912, and it was ascertained that a cow affected with generalized tuberculosis (lungs and udder involved) had been removed for destruction from the byre in October, 1912. This cow had been in the byre and used for milking for about four years. I isolated the bovine type of tubercle bacillus from both the cervical glands and the right faucial tonsil.

(d) C. H., aged 3. Swelling in neck appeared in February, 1910, when the patient was 2 years old. Abscess rapidly formed. Nourished from birth with unsterilized cows' milk, which was usually obtained from three cows in the father's byre, which contained thirty-eight cows. I interviewed the father, and found that one of his cows had died in May, 1910, from advanced generalized tuberculosis.

(e) Sometimes it has happened that two or three cases of tuberculous cervical glands have come from the same district in the town, within a few days of one another, to the Sick Children's Hospital. They had been supplied with milk from the same dairy for years, and I ascertained from the city veterinary inspector that a cow with a tuberculous udder had recently been removed from the byre in question.

(f) Some time ago Mr. Stiles was asked to see a baby the mother thought was suffering merely from the effects of teething. The child was found to be suffering not only from multiple tuberculous dactylitis of the hands and feet, but also from tuberculous disease of the upper jaw, of both frontal bones, and of the cervical and mesenteric glands. No operation was recommended. Death occurred six weeks later from tuberculous meningitis. The parents were both free from tubercle, as also were the other children. On inquiry into the milk supply Mr. Stiles was informed that two cows were kept on the Home Farm for the special use of the household, that they had both been tested, and that neither of them reacted to the tuberculin test, which had been applied six months previously. He suggested

that they were probably too tuberculous to react, and that the best plan would be to kill them. This was done, with the result that both cows were found to be suffering from general tuberculosis, and that one of them had a tuberculous udder. In this case it is evident that the cows were so extensively tuberculous that they failed to respond to the tuberculin test.

I merely instance these cases to show what is happening here and there throughout the country. They also prove that not only the resistance of the patient but the dosage exercises a great influence on the extent and spread of the disease.

While the faucial tonsils and the cervical glands must often succeed in killing the small numbers of tubercle bacilli which are frequently present in unsterilized milk, they fail to cope with such large amounts as are ingested by children who are unfortunately being nourished with milk from a single cow with tuberculosis of the udder or from a small herd harbouring a cow with udder tuberculosis or with advanced clinical tuberculosis. It has been shown by Delépine that one part of the milk from a cow with udder tuberculosis is capable of infecting 100,000 parts of sound milk and producing tuberculosis in guinea-pigs. He therefore concluded that one cow with udder tuberculosis was capable of infecting the mixed milk from a large herd. Further, it may be confidently stated that the reason why so many children do not present any clinical evidence of tuberculosis, in spite of the fact that they are frequently drinking infected milk, is to be found in a consideration of the results of certain animal experiments.

Feeding experiments in animals have shown that while inhalation of tubercle bacilli is a certain method of infecting the animal even when small doses of bacilli are employed, very much larger doses are required to produce the disease by way of the alimentary canal. It is perfectly plain, therefore, that when the milk is obtained from a single cow with udder tuberculosis, or with advanced generalized tuberculosis, or from the mixed milk from a small herd, containing one or more tuberculous cows, a child may receive the infection in concentrated form. If, then, man derives a certain percentage of infection from bovines, it is reasonable to expect that where tuberculosis in human subjects is of frequent occurrence, the bovine disease will also be rife, and that raw milk formed an important article of diet. It is not

remarkable that a causal relationship between the two does exist, when it is recalled how frequently raw milk is used as a food, and is one of the few animal products used by civilized man in the uncooked state. And, moreover, it constitutes the chief nourishment of the large majority of children. I believe that the chief reasons why bovine tuberculosis is so extremely common amongst children in Edinburgh and district are the great prevalence of tuberculosis in dairy cows, the present very inadequate veterinary inspection, and the gross ignorance of the dairy farmers in matters relating to bovine tuberculosis. Although extensive and accurate statistics are wanting in this country regarding the number of tuberculous cows, we have a sufficiency of data to form a fairly accurate estimate. The extent to which tuberculosis is prevalent in cows can only be determined by the tuberculin test, which has not been used very extensively in this country.

Inspection of the byres and cows in Edinburgh under the Public Health Department was first instituted in 1900. The following table, compiled by me from the medical officer's reports, 1900-1912, shows the number of tuberculous cows removed annually from the city byres:—

TUBERCULOSIS AMONGST EDINBURGH DAIRY COWS, 1900 to 1912.

Year	Byres in city	Byres closed	Number of cows	Veterinary inspections of city byres	Veterinary inspections of country byres	Number of cows removed for tuberculosis	Site of tuberculous lesions
1900	124	—	3,000	—	—	25	Tuberculosis of udder, 11.
1901	140	5	3,366	1,863	—	23	Tuberculosis of udder, 14.
1902	127	15	3,097	1,601	—	16	Udder, 5; lungs, 4.
1903	115	4	3,072	2,021	—	35	Lungs, 24; udder, 5; clinical, 6.
1904	115	3	2,974	1,866	—	39	Lungs, 27; udder, 5; clinical, 7.
1905	111	7	2,942	2,113	—	37	Lungs, 23; udder, 9; clinical, 5.
1906	108	4	2,944	2,211	—	31	Lungs, 20; udder, 5; clinical, 5; uterus, 1.
1907	99	9	2,765	2,070	10	29	Lungs, 19; udder, 9; clinical, 1.
1908	97	2	2,793	1,638	10	28	Lungs, 14; udder, 3; clinical, 11.
1909	96	1	2,831	1,531	22	36	Lungs, 23; udder, 13.
1910	90	6	2,708	1,439	30	36	Lungs, 9; udder, 20; clinical, 7.
1911	81	9	2,446	1,158	20	27	Lungs, 16; udder, 6; clinical, 5.
1912	76	5	2,318	1,126	20	23	Lungs, 9; udder, 10; clinical, 3.

It will be observed that much attention has been given to the establishment of better ventilated and more sanitary byres in

Edinburgh. In spite of the closing of so many byres during the last twelve years, the number of tuberculous cows removed annually from the city byres remains practically the same, which would point to very little benefit having followed from improved animal sanitation. These observations are also identical with those made by Professor Delépine in the Manchester district. Further, it is to be noted that the Edinburgh City veterinary inspector has ordered, on an average, the removal of thirty tuberculous cows annually from the city byres, and of the thirty about ten had tuberculosis of the udder.

The important practical point to consider is the extent to which tuberculous cows yield tubercle bacilli in the milk. Until a few years ago it was a commonly accepted view that tubercle bacilli were only found in milk when the udder was affected. As a result of the experimental work of Schroeder in America, and more recently that of the last Royal Commission on Tuberculosis in this country, we now know this not to be the case. Their results prove indisputably that tubercle bacilli may and do gain access to milk from cows which clinically show no signs of udder tuberculosis, or, indeed, any form of tuberculosis. Of course, it must be emphasized that extensive infection of milk with tubercle bacilli is mainly from cows either marked "piners" or those suffering from tuberculous infection of the udder. On this account chief significance must still be attached to the cows with udder tuberculosis, and information as to the prevalence of this condition in Scotland is most important and still wanting.

The very absence of any definite sign in the earlier stage is one of the greatest dangers of this condition. According to Delépine it is practically impossible for the veterinary surgeon unaided to discover by ordinary inspection early tuberculous lesions of the udder. Further, it is also impossible for the most experienced veterinary surgeon to distinguish by inspection and palpation tuberculous mastitis from all the other forms of mastitis. There appears to be no escape from the conclusion that clinical examination alone cannot be relied on for the detection of udder tuberculosis, and one naturally asks how it can be reliably detected. Inoculation of the milk into experimental animals (guinea-pigs and rabbits) is the most certain method. This method, as far as I can gather from the medical officer's annual reports (1900 to 1912), is very seldom employed in Edinburgh.

The milk from a tuberculous udder retains for a long time—often a month—its natural appearance. The possibility of infection is thereby highly increased, for the milker lets the milk run into the pail as long as it looks natural, and sometimes even after it has commenced to look somewhat thin and fluffy. Tuberculosis of the udder is, therefore, a very dangerous disseminator of infection, and it is by no means a rare disease.

What system is employed at present in Scotland to protect the public against an undoubted source of infection? In the smaller towns and villages scattered throughout Scotland there is practically no veterinary inspection whatever. In the larger towns there is a certain amount, but its complete inadequacy is only too apparent; for example, in Edinburgh, one veterinary surgeon (who is also a food and drug inspector) is expected to examine all the cows—fully 2,000—in the city byres at intervals of not less than three weeks, and in addition he endeavours to supervise the supply of milk from the byres outside the city boundary (numbering about 250 compared with 76 inside the city). Referring to the city report for 1910, 1,439 inspections of the city byres are recorded against 30 of the byres beyond the city. The inadequacy of this supervision is quite apparent, and the fact that the city milk supply from the country is steadily increasing every year strongly emphasizes the immediate necessity for some radical change. Under the provisions of the Public Health (Scotland) Act, 1897, and the Edinburgh Municipal and Police (Amendment) Act, 1891, the owner of a tuberculous cow is ordered to have it removed within a specified time—namely, twenty-four hours—after the official notice is served; but it is left entirely to his own discretion to dispose of the diseased cow as he may think fit. The seller is under no compulsion to say in what manner he has disposed of the animal, and the buyer is not compelled to notify the authorities that he is in possession of a tuberculous cow.

This is indeed a travesty and burlesque of efficient administration that there is absolutely no safeguard against a considerable proportion of these animals, for a time at least, continuing to propagate the disease. As no method of branding such animals is employed there is no reason why the tuberculous cow may not be transferred to another herd and continue contributing to the city's daily milk supply, or find its way to the North of England, as a great many do.

Although it is an undisputed fact that tuberculous milk is very much more dangerous than is tuberculous meat, yet the anomaly of the situation is evident when it is noted that the local authorities have powers to seize and destroy tuberculous cows exposed for sale for food purposes, but are powerless to seize tuberculous cows supplying milk for human consumption. Surely, in the face of all the foregoing evidence it cannot be denied that the provision of a pure, wholesome, and tubercle-free milk supply is a problem of great national importance, and rightly claims its immediate consideration by the Government. It seems almost criminal negligence to permit the present state of affairs to continue.

Tuberculosis amongst dairy cows could be practically eliminated in time by providing, throughout the United Kingdom, for a regular and adequate system of veterinary inspection; the frequent examination of samples of milk by inoculation of experimental animals; the destruction of all cows which show evidence of tuberculosis of the udder, tuberculosis of the lungs, or give tuberculous milk, and those which are clinically tuberculous; the segregation and permanent ear-marking of all animals reacting to the tuberculin test; and the absolute prohibition of the use of their milk for human food; and, finally, the gradual establishment of tubercle-free herds.

CHANNELS OF INFECTION.

From what has already been said regarding the order in which the cervical lymphatic glands are infected my conclusion is that the mouth and naso-pharynx have been the avenues of infection.

The more frequent involvement of the glands in front of the sterno-mastoid muscle in the upper carotid region is strongly suggestive of the faucial tonsils being more often a source of infection than the adenoids. In tuberculous disease of the upper deep cervical glands the faucial tonsils have an importance not hitherto well enough recognized or understood. The position of the tonsils at the entrance to the digestive tract favours infection more with food than with inspired air, a fact of great consequence in considering the frequency with which cervical glands in children harbour the bovine type of tubercle bacillus. Furthermore, the very direct and short pathway between the tonsils and the tonsillar lymphatic glands explains the frequency

with which well-marked tuberculosis of these glands may be secondary to a small focus in a tonsil.

Lesions in the Tonsil.—I have investigated the faucial tonsils from 64 consecutive cases of children suffering from tuberculous disease of the upper deep cervical glands; 24 (37·5 per cent.) of these cases showed histological evidence of tuberculosis in the tonsils. There are no clinical signs by which the condition can be recognized. In the majority of cases the tonsil retains its normal appearance, is small, and frequently receding. Occasionally the tonsil is flat and its surface fissured, or it may be hypertrophied, the external surface showing *no* ulceration. The chief sites for tuberculous lesions in the tonsil are:—

(1) Surrounding the deeper parts of crypts, especially the supratonsillar group.

(2) Immediately under the mucous membrane near the mouths of crypts.

(3) Deep in tonsil, close to posterior capsule.

The lesions may be localized or generalized.

Experimental inoculation of guinea-pigs and rabbits with pieces of tonsillar tissue yielded positive results in nineteen cases (30 per cent.); and of these the bovine bacillus was present in twelve cases and the human in three cases.

I have also investigated the hypertrophied faucial tonsils removed from ninety children, in whom the cervical glands showed no clinical evidence of tuberculous disease; six (6·5 per cent.) of these hypertrophied tonsils gave histological evidence of tuberculous disease, while nine (10 per cent.) yielded positive results when inoculated into guinea-pigs. The bovine bacillus was present in three cases, and the human in one case.

GENERAL CONCLUSIONS.

Cows' milk containing bovine tubercle bacilli is clearly the cause of 90 per cent. of the cases of tuberculous cervical glands in infants and children residing in Edinburgh and district, and is responsible for by far the larger proportion of tuberculous cervical glands in children during the milk drinking period of life (0 to 5 years).

The concentration of attention on the existence of human sources of infection has in the past quite overshadowed the evidence that the drinking of milk is an important factor in the infection of children with tuberculosis. Having demonstrated

that a larger percentage of cases of tuberculous cervical glands in children is due to the bovine tubercle bacillus than previously believed, the need for immediate action is evident and becomes an absolute necessity.

Bovine tuberculosis can, therefore, no longer be considered a negligible factor in respect to the spread of tuberculosis amongst children, more especially since unsterilized cows' milk in this country is a vehicle by which tubercle bacilli must most frequently be introduced into the bodies of children.

The powers at present vested in our local authorities are grossly inadequate, and it seems to me to be our special duty to endeavour to prevent this enormous and entirely preventible amount of tuberculosis amongst children. It is a national problem, and the earlier it is faced the more easily will it be solved.

That measures for the protection of children against infection with the bovine virus are indispensable is an indisputable fact. Whatever powers may be given to the local authorities, they must, to be effective, be so framed that their application throughout the United Kingdom will be uniformly compulsory. I am convinced that the Tuberculosis Order (1913) would in conjunction with the Milk and Dairies Bill (if passed) result in a marked diminution of abdominal and cervical gland tuberculosis in children.

Until the proper legislative measures are obtained it is imperatively necessary for the public to sterilize cows' milk for the feeding of children. I think there has been an unfortunate prejudice in this country against the sterilization of milk.

Regarding the channels of infection, the faucial tonsils have in tuberculosis of the upper deep cervical glands an importance not hitherto well enough recognized or understood—that is, they act not only as most frequent portals of entry for the tubercle bacillus, but in a large proportion of cases a well-marked tuberculosis of the upper deep cervical glands is secondary to a small tuberculous focus in the tonsil. The high percentage of faucial tonsils in which the bovine virus was present is further striking proof of the frequency of tuberculous cows' milk as a source of infection.

The results of my investigations are widely different from those of investigators in other countries, but I believe they can be verified by the recognition of several correlative factors: (1)

The age of the patients; the importance of investigating a large number of consecutive cases of the disease in young children has not been sufficiently recognized. (2) The family history of tuberculosis. (3) The almost universal practice in Scotland of feeding children with unsterilized cows' milk. (4) The great prevalence in Scotland of tuberculosis in dairy cows, and, in conjunction with this, the present very inadequate veterinary inspection and the gross ignorance of the dairy farmers in matters relating to bovine tuberculosis. (5) The fact that about two-thirds of the Edinburgh daily milk supply comes from small byres situated in rural districts round the city, where there is practically no supervision. Greater facilities of infection with the bovine virus are thus afforded in the country compared with the town. Of the children in my series harbouring the bovine tubercle bacillus, almost 50 per cent. had been born and brought up in the rural districts round Edinburgh.

Further, I claim that there is the greater likelihood of a more accurate interpretation of the bacteriological findings if the investigator possesses a combined pathological and clinical experience, and entirely controls the various branches of the investigations.

In conclusion, I have to thank Professor James Ritchie and Mr. Harold J. Stiles for much valuable advice in these investigations.

REFERENCES.

- M. DORSET. *Amer. Med.*, 1902, iii, p. 355.
 PARK and KRUMWIEDE. *Journ. Med. Research*, 1910, xxiii.
 CRUICKSHANK. *Brit. Med. Journ.*, 1912, p. 1298.
 COBBET. "Royal Commission," Second Interim Report, Part II Append., iii, p. 23.
 MOELLER. *Deut. med. Woch.*, 1902, p. 718.
 BECK. "Festschrift zum Sechzigsten Geburtstag von Rob. Koch," Fischer, Jena, 1903.
 PAUL A. LEWIS. *Journ. Exp. Med.*, January, 1910.
 "Royal Commission on Tuberculosis," Second Interim Report, part II, ii.
 H. BURCKHARDT. *Deut. Zeit. f. Chir.*, Leipzig, August, 1910.
 W. LITTERER. *Med. Rec.*, December, 1910.
 A. WEBER. *Deut. med. Woch.*, December, 1906.
 PARK and KRUMWIEDE. *Journ. Med. Research*, December, 1911.
 F. OEHLECKER. "Tuberk. Arb. a.d.k., Gesund.," 1907, vi.
 German Imperial Health Board, *Deut. med. Woch.*, October, 1905.
 GEO. B. WOOD. *Amer. Journ. Med. Sci.*, 1905, p. 224.
Ibid., 1906, p. 620.
 HAROLD J. STILES. "Syst. Oper. Surg.," by Burghard, iii, p. 6.
 SCHROEDER. "Sixth International Congress on Tuberculosis," part II, iv, p. 604.
 "Royal Commission on Tuberculosis," Third Interim Report.

Clinical Articles.

TUMOUR OF THE UMBILICAL REGION COMPLICATED WITH HERNIA.

By E. WALLIS HOARE, F.R.C.V.S.

Cork.

CASES of this nature in the horse are of sufficiently common occurrence to merit consideration. The clinical phenomenon is a swelling of the umbilicus, which resembles an umbilical hernia, but on examination a solid growth is present as well as intestine. The growth appears as if attached to a remnant of the umbilical cord. It is fibrous in character and in some instances a cavity is present in its centre. Occasionally there is adhesion between the tumour and the intestine.

As regards surgical treatment, two methods present themselves:—

(1) Excision of the tumour, preceded by reduction of the hernia, and followed by suture of the umbilical opening. This is no doubt the most surgical method, and it has the advantage of enabling the operator to discover the presence of adhesions. But it is troublesome and not without risks, as the sutures may give way and the intestines then fall to the ground. Or there may be a recurrence of the hernia. Attempts to operate without destroying the hernial sac are doomed to failure, as a recurrence of the hernia is bound to occur.

(2) The use of the clamp. This method, although crude, is successful and simple, provided no adhesions are present. The differential diagnosis often proves difficult, and a very careful examination is necessary in order to decide whether adhesions are present or otherwise, as the tumour is apt to mislead us. If in doubt it is safer to explore prior to fixing the clamp. The best form of clamp is the metal one, provided with regulating screws. It is advisable not to screw up too tightly. In one case which came under my care recently, the clamp did not separate until the sixteenth day, and on assisting removal of the mass there was profuse hæmorrhage. In order to prevent pain at the time of operation and succeeding it, a dose of chloral hydrate administered by enema, succeeded by chloroform inhalation, should be given. A hypodermic injection of morphine and

hyoscine, when the horse rises after the operation, proves useful and prevents the severe pain which is manifested as a sequel to the operation; besides, it ensures quietude and thus favours adhesion of the peritoneal surfaces of the sac.

It is always advisable to give a dose of anti-tetanic serum as a preventive of tetanus.

Experience of both methods of operating have proved to me that the clamp is by far the more preferable, and the same applies to ordinary cases of umbilical hernia.

TUBERCULOSIS IN A HORSE.

BY CAPTAIN GRAHAM REES-MOGG, F.R.C.V.S.

British Expeditionary Force, France.

ON October 10 a horse was brought to me to see suffering from a nasty discharge from both nostrils. I was then informed that eighteen months previously he had had a bad attack of pneumonia, since when he had suffered from a nasal discharge which sometimes got better and then got worse again. His temperature was 102° F. The horse looked very weak and thin, and was very distressed and done up, so he was destroyed. As it was a rest day I was able to make a *post-mortem* examination. The right lung had hardly any normal lung tissue remaining in it. A small portion was in a state of white hepatization from recent pneumonia, and there were numerous gangrenous cavities, varying in size from a pea to a walnut, with calcareous and caseous matter in their walls. The larger ones were of a greenish-black colour. The left lung contained three large (Brazil nut) irregular abscesses containing pus, and also one very large (tennis ball) cavity with calcareous deposits and fibrous tissue in its walls. (A medical officer who was with me informed me that it was typical of a chronic case of tuberculosis in the human subject.) The bronchial and mediastinal glands were also enlarged, one showing signs of caseation. The abdominal organs showed no naked eye appearance of disease. What makes the case so interesting to me is that the horse never missed a day's work (very hard work too) since he came out here on August 16. In my opinion the subject was suffering from tuberculosis of long standing, with recent pneumonia caused by septic infection. I should be very grateful if readers of your Journal who have proved cases by microscopic and other methods to have been tuberculosis would give me their views of this case.

VENTRAL HERNIA, PERITONITIS, AND DEATH.

By W. CARGILL PATRICK, F.R.C.V.S.

Mullingar.

THE subject was an aged harness pony, the history being that the animal had been grazing where the dairy cows were turned out daily, and when seen the night previously was apparently all right, but the following morning was found standing by itself, dull, stiff, and not inclined to move, yet showing no acute pain; on being taken into the stable a fairly large swelling in the right flank was observable, and our attendance was requested. Seen some hours later, a good deal of inflammatory effusion or exudate had taken place—in fact, almost sufficient to mask the hernia present; the wound in abdominal wall readily admitted the tips of three fingers. When the hernia had been reduced, a proper bandage or surcingle applied, pending a suitable pen or stall being got ready, and a sedative administered, the case appeared relieved, and remained so for three days, which justified the hopeful prognosis given, but on the fourth day disquieting symptoms began to appear. As it was found impossible to keep the pony in the special stall prepared for her, and acute colicky pains were present, with a desire to maintain the dorso-sacral position, sedatives and antiseptics were prescribed, but our services were again requisitioned; the following day, as the pain, though relieved, still persisted somewhat, chloral, sodii bicarb. and sodii sulph. in suitable doses were given and hot fomentations ordered. The temperature was subnormal, membranes injected, pulse irritable and accelerated, respirations increased, dull pain was more or less continuous, and death took place on the eighth day, the animal lying on its back for most of the time two days previous to death, this being the only position which seemed to afford relief, and at the same time suggested that the bowel itself had been probably severely bruised or injured when the rent in abdominal wall took place. Unfortunately, I was not afforded the opportunity of a *post-mortem*. It occurred to me that had the fomentations been employed earlier the condition might have been relieved or even checked, but is such practice justifiable in the absence of more urgent symptoms in view of the probable excoriations and subsequent sloughing where the bruising has been intensive? I may mention I had a similar case only a few weeks previously, where the horse had been caught up in a hedge,

a stab having ruptured the abdominal wall to a much greater extent, yet leaving the skin intact. Fortunately, the effusion in this case was even greater than the above. Same was controlled with cold applications, and no subsequent sequelæ developed, the animal making a good recovery, with no permanent hernia resulting.

Keeping the animal quiet by placing in a restricted space or position, light diet, in fact, semi-starvation, and raising of the hind quarters, I consider of more value than any external application or surgical appliance, that is, of course, for the purely hernial condition.

CONTAGIOUS OPHTHALMIA AMONG CATTLE.

By SATYENDRA NATH MITTER, G.B.V.C.

Senior Lecturer, Bengal Veterinary College.

(From the Raymond Research Laboratory.)

INTRODUCTION.

ON behalf of the Government of Bihar and Orissa I was deputed last April, with the permission of the Director of Agriculture, Bengal, to go to Puri, to investigate an outbreak of contagious ophthalmia among the conservancy bullocks there. The disease, though peculiar to lower animals, is said to affect human beings as well.

DEFINITION.

This disease may be defined as an acute epizootic ophthalmia, characterized by the usual symptoms of conjunctivitis and discharge consisting of serum, mucus, epithelial cells, leucocytes, &c., and occurring generally in an epidemic, but occasionally in a sporadic form.

SYMPTOMS.

The preliminary symptoms in this outbreak were those of slight fever (temperature rising to 102° to 103° F.), arrest of rumination, and a certain amount of constipation. This was followed by a uniform hyperæmia of the conjunctiva and a profuse watery discharge, consisting of the elements described above. The eyelids became swollen and totally or partially closed. There were hypertrophy and œdema of the lymphoid tissue, and occasional infiltration with leucocytes. After two days the ocular symptoms became aggravated and a small point

of opacity was noticed, which increased (according to the severity of the attack), and sometimes affected the whole conjunctival membrane. In a few severe cases erosions appeared, which in some cases ultimately led to perforation of the eyeball and consequent loss of vision, and in others the eroded surfaces healed up and cicatrized. The period of incubation varied from three to seven days.

BACTERIOLOGY.

A considerable number of micro-organisms are responsible for the production of acute epidemic conjunctivitis, but from cultural and biological tests, carried out in the laboratory, it appeared that this epidemic was mainly caused by *Micrococcus lanceolatus* (pneumococcus of Fränkel), and partly by the bacillus of Morax-Axenfeld. These organisms were detected in large numbers in the smear preparations of the affected eyes of the animals. They were chiefly found in and outside the cells of the discharge, and also in the superficial epithelial cells of the conjunctiva. The pneumococcus of Fränkel is a diplococcus having both the poles pointed, and is surrounded by a capsule. It is easily stained with aniline dyes and with Gram. The bacilli of Morax and Axenfeld are thick bacilli, and occur in pairs or in small chains. These organisms are not stained with Gram and are of a pleomorphic character. They are generally non-pathogenic to lower animals.

It may be noted that both these organisms appear to have no action on unbroken conjunctiva, but when in contact with an abraded surface (as is not uncommon in cattle) they are liable to produce disease.

TREATMENT.

The treatment resorted to was washing the affected eyes with a corrosive sublimate (1 in 5,000) lotion, and protecting them from dirt, &c.; but beneficial result may also accrue from using boric lotion (1 in 100) or silver nitrate (1 in 100). Recovery generally took place within ten or fifteen days.

REMARKS.

This disease, though affecting human beings, especially children, appears peculiar to lower animals. It is highly probable that this outbreak originated by infection from human beings.

My thanks are due to Babu A. C. Routra, Veterinary Assistant of Puri, for his help.

FIBROBLASTIC MYOSITIS OF THE EYE MUSCLES.

[TRANSLATED BY T. M.]

A BULL, about 11 months old, showed prolapse of the right eye, with much cloudiness of the cornea and effusion into the anterior chamber of the eye. At first it was believed that an injury out at pasture had been the cause, and reposition was tried after using cocaine solution. This was successful after considerable trouble. A bandage lined with wadding was firmly placed on, and this was moistened several times daily with acetate of alum solution. The bandage was changed morning and evening. The eye, however, became more and more like a fish's eye, prolapsed again, and could no longer be put back into the orbita. Since there was a flow of tears from the other eye the enucleation of the right eye was resolved on next day, and at the same time orbital tuberculosis was suspected. After anæsthetization the conjunctiva, the muscles, and the nerve were severed by means of the curved scissors. Now the presence of a retrobulbar growth could be seen on close examination of the orbital cavity. After removal of the tumour, cautious disinfection, tamponing with xeroform gauze, suturing of the eyelids was performed, a tip of gauze left out at an opening at the inner canthus and a bandage put on. Microscopic examination of the growth showed fibroblastic myositis of the eye muscles.

PARTURITION CASE.

[TRANSLATED BY T. M.]

At an official examination of a dairy the owner asked us to look at a cow which three days previously had suffered from a violent attack of colic. The general condition of the cow, far advanced in calf, showed no changes. The udder was much drawn up. The suspected *torsio uteri* was confirmed by the characteristic three-folded condition of the vulva. Exploration of the vagina left no doubt as to the diagnosis. After several turnings to the left of the cast animal the twist was remedied. In spite of long waiting the uterus remained in atony. The

cervix must be artificially dilated. The foetus proved to be dead after the envelopes had been opened with an instrument. Further examination gave the following diagnosis as regards the calf: Anterior presentation, head turned to the right, and the right face and right leg of calf bent at the knee accessible. The calf was put straight, and extraction accomplished with the help of several men, as the mother gave absolutely no help and did not strain at all. Although the mouth of the womb was torn and subsequently metritis set in, yet the cow recovered completely. It was noteworthy that the assistant at the parturition and the man who helped him with the calf, as well as the owner of the animal, who carried out the injections, suffered after a few days from a complaint of the hands and arms which took the form partly of suppurating furunculosis and partly of severe lymphangitis, although at the time of the birth thorough disinfection with lysol had been practised.

ACORN POISONING IN COW.

By HENRY B. EVE, M.R.C.V.S.

Folkestone.

Subject.—An aged shorthorn halfbred cow, the property of a Kent farmer about nine miles distant.

History.—The animal concerned had been running in meadow where acorns abound and grass keep is very scarce.

Symptoms.—Dry muzzle, general dulness, loss of appetite, temperature about normal, inveterate constipation present through the astringent action of the contained active principle of acorns, viz., tannin. This was followed by persistent blood-tinged diarrhoea. The animal evinced signs of great pain on pressure of the region of the loins, the urine was colourless and voided in large quantities, and cow continually grunted. The lumen was engorged in a condition known as plenalvia, and somewhat tympanitic, and the omasum had a doughy feel externally, and the usual concomitant symptoms of omasitis were present, with cerebral complications. The cow vomited acorns practically undigested, and passed some during defecation, which aided diagnosis considerably.

Diagnosis.—Acorn poisoning.

Prognosis.—Guarded, unfavourable, animal having been ailing three days and attended by a cow-leech.

Treatment.—Punctured the rumen, gave an oleaginous purgative, ol. lini 2 pints and ol. crotonis 3i. Externally applied mustard as a counter-irritant to the rumen and omasum. Gave internally chloral hydras., pot. bromid. and glycerine of belladonna to relieve the pain, followed on by diffusible stimulants, ammon. carb., zingib., and pip. cayenne; gentian and nux vomica in warm ale to act as nervine tonics. Usual mag. sulph. and treacle given by cowman ere arrival.

Diet.—Demulcent gruels, linseed tea, and boiled roots.

Result.—Recovery took place apparently in about five days, when a relapse followed, and death resulted, as anticipated, from acute prostration.

Post-mortem.—Great gastro-enteritis, bladder full or nearly so. Omasum contained pieces of green and brown shiny husk, the leaves between them being congested. The abomasum was very congested, deep black or purple colour. The small intestine showed inflamed patches like markings of a zebra.

Remarks.—I have seen acorn poisoning in pigs before, but never in cattle.

A BLOOD-CLOT RESEMBLING A STRONGYLE.

By HENRY TAYLOR, F.R.C.V.S.

Haywards Heath.

MR. NOEL PILLERS, in a recent issue, records an example of the above, and as a certain amount of interest was evinced in the occurrence the record of another may not be out of place.

A cow developed a hæmorrhagic nephritis and cystitis, and during the course passed at times clots of blood amongst the urine. One day she passed what to all appearance was a red worm, similar to the *Megalocephala* variety, and it was only after careful examination and section that I could satisfy myself that it must be a cast of the urethra.

BACILLARY NECROSIS OF THE LIVER: A DISEASE
OF THE UNBORN LAMB.

BY PROFESSOR CAVE, F.R.C.V.S.

South-Eastern Agricultural College, Wye, Kent.

At the beginning of March of this year a report was received at the College from a sheep owner in East Kent, that his ewes were dropping a large proportion of stillborn lambs. As it was supposed to be a matter of agricultural interest, Mr. Garrad visited the farm and found that forty-eight Kent ewes had produced sixty-four dead lambs. The lambs were born at full term, and those which survived birth were found to be strong and healthy and evidently doing well. No injury likely to cause such a loss was discovered, nor was there anything in the management of the ewe flock which could be held responsible for so many stillborn lambs.

The owner then explained to Mr. Garrad that he had examined a number of dead lambs, and in many he had found what he described as "spotted livers." As this seemed a possible clue to the cause of the trouble, the owner was requested to send a dead lamb to the College for a pathological investigation. The first lamb arrived on March 6. It was fully developed, the lungs contained air, proving the lamb had breathed, but the remnant of the umbilical cord was in a perfectly fresh condition, so that evidently the lamb had not long survived its birth.

An examination of the liver at once revealed its "spotted" condition. No other lesions were found in any part of the body. The illustration shows clearly the "spotted" appearance of the liver.

These "spots" had a strong resemblance to the lesions produced by the bacillus of necrosis as found in the livers of other animals, but the centre of some of the diseased patches was slightly depressed, a condition not usually seen in bacillary necrosis. Inquiries of other pathologists and a careful search through the literature of bacillary necrosis failed to discover any information as to this disease affecting the livers of unborn lambs. Bacillary necrosis is met with in many different forms in the domesticated animals, all of which appear to be susceptible to infection. The bacilli are found in the diseased areas in long wavy filaments which are intricately interwoven. They are strict

anaerobes and have a wide distribution in the soil, especially of cultivated land.



The arrows show the diseased patches in the liver.

Natural infection may occur through the alimentary canal, or by means of wounds or abrasions.

The bacillus has been found in certain cases of poll-evil, quittor, ulceration of the intestine in horses.

In cattle it has been found in "foul-in-the-foot," and certain affections of the mouth. It has also been seen in necrotic areas in the livers of cattle and sheep, and in certain forms of navel-ill in both calves and lambs; but in no case, as far as can be ascertained by the writer, has it been known to cause bacillary necrosis of the livers of unborn lambs.

In navel-ill of lambs, occurring some weeks after birth, the bacillus has evidently reached the liver by way of the open umbilical vein. As a result of the invasion numerous areas of necrosis are found in the liver.

In the outbreak under investigation the diseased condition of the liver had evidently preceded birth, as the lamb had lived, at most, only a few hours.

It appeared to us that this loss of stillborn lambs might be something new to science, and a further investigation was desirable.

The owner was asked to send dead lambs as opportunity served. Altogether ten dead lambs were received and examined. In each case the umbilical cord was examined and the lungs were tested for the presence of air.

Of the ten examined, eight were found to have "spotted" livers; the remaining two showed no signs of the disease. Two other lambs were sent from another farm, but neither was affected.

The eight lambs which were found to be diseased were of different ages. Some had never breathed, as shown by the uninflated lungs; some had just breathed, but the umbilical cords were found to be quite fresh; others had lived one or two days. The oldest examined were fourteen days old. In all the same diseased areas were found in the liver. In one case, in which the lamb had lived a fortnight, a few large diseased patches were found exactly similar to those shown in the illustration, but in addition there was a large number of much smaller areas, which it was thought *might* possibly have developed from infection through the navel *after* birth.

A microscopical examination of the diseased areas was made and the presence of the bacillus of necrosis was determined.

A shake culture of the necrosed tissue in nutrient agar was

prepared, and grew colonies of the bacillus of necrosis resembling small balls of cotton-wool. In glucose agar the growth caused considerable breaking up of the medium by gas formation. A rabbit was inoculated with an emulsion of the necrosed tissue into the thigh. In ten days extensive necrosis of the skin was seen. The rabbit was then destroyed and examined. There was extensive necrosis of the skin, and a circular patch of necrosis extended through the muscles of the abdominal wall at the groin down to the peritoneum. The area of necrosis in the abdominal wall had the appearance of tissues destroyed by a strong acid.

As a result of the investigations, it was concluded that the loss of about 100 lambs, mostly stillborn, was due to bacillary necrosis of the liver, but no evidence could be obtained as to the origin of the disease. It was evident that the disease must have existed for some considerable time before birth, and the only route by which the bacillus could reach the liver of the foetus *in utero* would be by the umbilical vein and the blood returning from the placenta, where the blood of the foetus must have become infected from the uterine blood. An attempt was made to discover the presence of bacillary necrosis in the ewes, but unfortunately only one was available, and yielded a negative result, and the investigation ceased for lack of further material.

The disease, although unknown, must have occurred on many occasions and has passed unnoticed. As it evidently is of some economic importance it is desirable that further investigations should be made, and flock-owners are earnestly requested to communicate with the Veterinary Department of the College should any "spotted" livers be found in stillborn lambs or in lambs a few days old.

INOCULATION AGAINST SWINE FEVER.*

CONCLUSIONS OF REPORT, BY PROFESSOR F. HUTYRA.

SWINE fever may be successfully combated by serum injections and by simultaneous inoculations.

A potent serum confers immunity against both experimental and natural infection with the filterable swine fever virus, and indirectly against secondary bacterial infections (mixed infec-

* Reprinted. Tenth International Veterinary Congress, London.

tions). Animals that are injected with serum and simultaneously or shortly afterwards exposed to natural infection acquire a permanent active immunity. Serum injection is therefore indicated in the case of recently infected premises, and if the injections are made as soon as the presence of the disease is recognized they have the effect of rapidly cutting short the outbreak.

By the simultaneous method pigs immediately acquire an active immunity which is lifelong. On previously healthy premises the simultaneous method, as a rule, causes little or no loss, but excessively severe inoculation reactions cannot be avoided. Until the inoculation reactions are passed great care must be exercised to prevent the spread of the disease.

A BRIEF NOTE ON AN OUTBREAK OF SEPTICÆMIA AMONG THE MONAL PHEASANTS OF THE CALCUTTA ZOOLOGICAL GARDEN.

BY MAJOR A. SMITH, F.R.C.V.S., &c.

Principal, Bengal Veterinary College,

AND

S. N. MITTER, G.B.V.C.

Senior Lecturer, Bengal Veterinary College.

(From the Raymond Research Laboratory.)

INTRODUCTION.

ABOUT the last week of February a fairly widespread virulent outbreak of septicæmia broke out among the monal pheasants of the Calcutta Zoological Garden, which carried off within a few days many valuable specimens. Our thanks are due to Mr. Basu, the Superintendent of the Garden, for sending us three bodies for *post-mortem* examination, and thus affording us an opportunity of studying the disease.

DEFINITION.

This disease may be defined as a virulent septicæmia, characterized by suddenness of attack, somnolence, violent diarrhoea, and fatal termination within a few hours.

SYMPTOMS.

At the onset the birds became dull and depressed, and preferred to sit alone and keep to themselves. Their feathers seemed ruffled and disarranged. These symptoms were followed

by greenish yellow diarrhoea occasionally tinged with blood. Their feathers became soiled with faecal matter. Thirst was present, with occasional champing of the jaws. They became very sleepy, and only aroused themselves from their stupor when they were made to do so. In some instances vomition was also present. Death generally took place within twenty-four to forty-eight hours.

INCUBATION AND DURATION.

Owing to suddenness of attack and rapid termination the period of incubation generally remained unnoticed. In experimental cases death usually took place in rabbits in eighteen hours, pigeons in twelve hours, and chickens in twenty-four hours.

SUBJECTS SUSCEPTIBLE.

The inoculation experiments have shown that G.P.S. pigeons and young fowls are very susceptible to this disease. Adult fowls and rabbits resist the infection to a considerable degree.

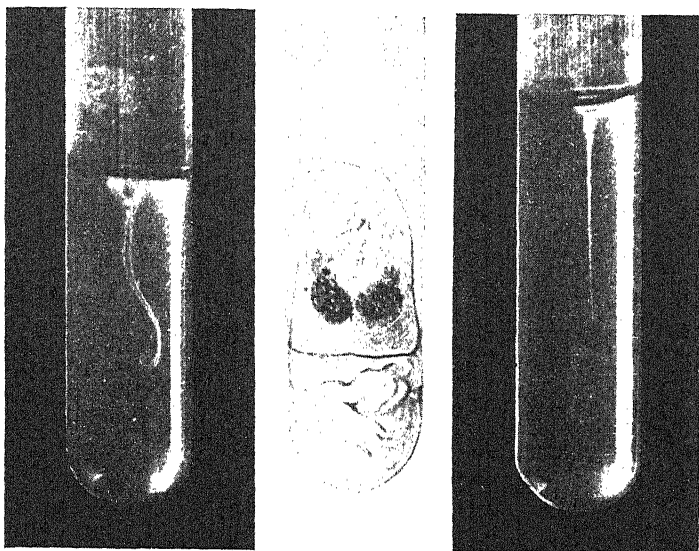


Figure illustrating the appearances of the cultures in various media respectively.

POST-MORTEM.

In spontaneous cases the main pathological changes were chiefly confined to the gastro-intestinal tract. There was uniform congestion and inflammation of the canal. The gizzard and the

proventriculus were full of serous exudate. The intestinal mucous membrane was highly inflamed and showed desquamation of epithelium, and contained yellowish blood-coloured liquid. The spleen appeared to be anæmic, but the rest of the organs were normal.

BACTERIOLOGY.

From the cultural and biological experiments carried out in the laboratory we have been able to isolate the micro-organism which is responsible for this outbreak. This is known as "*Vibrio Metchnikovii*." The organism was present in large numbers in the smear preparations of different organs and intestinal contents of the animals sent to us. They were also recovered in pure cultures, which, when injected into susceptible animals, reproduced the disease. The vibrio of Metchnikoff appear in thick curved, blunted rods, or resembling cocci or small bacteria in the short and thicker specimens, or in spiral filaments. They are easily stained with methylene blue, carbol-thionine, weak solution of fuchsin, gentian violet, but do not take Gram. They grow in all ordinary media.

In Broth.—A uniform turbidity takes place in twelve hours, followed by a formation of a thin pellicle on the surface within twenty-four hours.

On Agar Slant.—A yellowish-white luxuriant growth, with a deep tint in the centre within twenty-four hours.

In Gelatine Stab.—The top layer of gelatine is liquid within twenty-four hours, followed by formation of gas bubbles in forty-eight hours, the growth resembling a funnel.

On Potato.—A yellowish-brown growth, varying from forty-eight to seventy-two hours.

In Eggs.—Inoculated with Huppe's method shows in ten days that the white is quite dissolved and converted into a turbid yellowish fluid, while the yolk, which preserved its shape and consistency, became quite black.

Broth or peptone cultures twenty-four to forty-eight hours old, when treated with sulphuric acid and nitrate of soda, showed a very strong reaction to indol.

PREVENTION.

The best thing is to evacuate the infected enclosures for some time and to have them thoroughly whitewashed and painted.

The birds removed should be placed in small isolated cages, so that if any more become affected the disease will not spread to the healthy. The droppings of the infected birds should be burned, and new purchases should be kept under quarantine for about a week.

REMARKS.

In 1888 Gamalia, in a series of papers in the *Annals de l'Institut Pasteur*, first described an epizootic disease among fowls in Odessa, Southern Russia, and isolated the causative micro-organism, which he named as *Vibrio Metchnikovii* in honour of Professor Metchnikoff. Since then it has been studied by Pfeiffer in Berlin and by Kutcher in Lahn.

This micro-organism cannot be safely distinguished from that of Asiatic cholera of man by morphological and cultural tests, but only by biological experiments.

We are inclined to believe that this outbreak is quite identical with that described by Gamalia, and so far it has not been recorded in this country.

Canine Clinicals.

CANINE FILARIASIS.

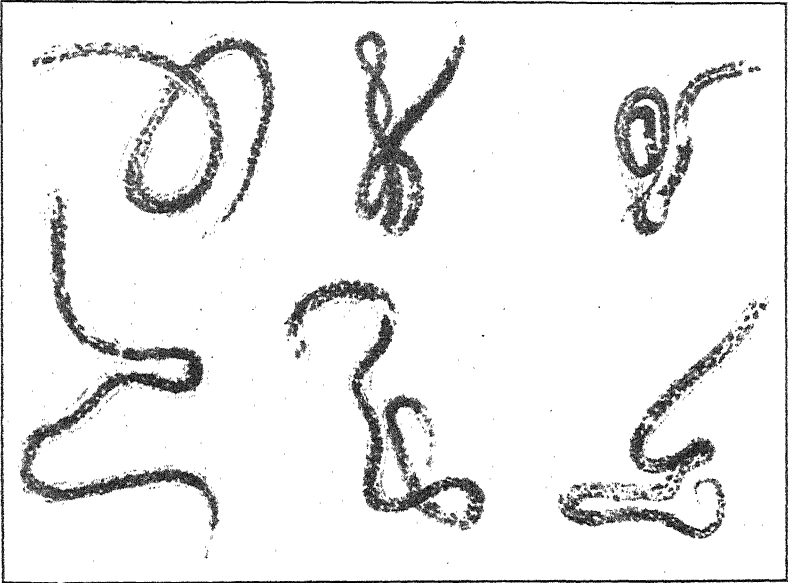
By S. N. MITRA and H. C. GANGULY.

(From the Raymond Research Laboratory, Calcutta, India.)

THE subject was a red kangaroo hound dog belonging to a European lady, and was admitted into this College Hospital on July 29, 1912, for treatment of punctured wounds in the shoulder. The animal appeared to progress satisfactorily, but on August 22 its temperature rose to 104° F. without any appreciable cause. The repeated administration of febrifuges, followed by cholagogues, produced no beneficial effect on the patient. From August 22 to 26 the thermic record showed 102° F. as minimum and 104.4° F. as maximum. On the latter date the blood was submitted to microscopical examination, and a number of filarial embryos were detected in the specimen. In their fresh state they appeared to be long, slender, snake-like organisms, translucent and apparently structureless, wriggling about in the blood; when stained with methylene blue or hæmatin and eosine they

were found to be composed of closely packed granules of protoplasm, with no definite detectable sheath. The body of the parasite was cylindrical and of the same dimensions throughout, except at the tail, which was tapering and finely pointed. The mouth of the embryo was conical and blunt and devoid of cephalic armature. The average length was 300 microns.

The number of parasites varied in the smears taken at different times of the day, being few (one to three in the morning, and as many as five to ten in the evening). An attempt to reproduce



Filarial embryos.

the disease by inoculation was an apparent failure—most possibly an intermediate host being required. Experiments in order to determine an intermediate host and other observations on the biology of the parasites could not be pursued, as the owner removed the dog from the hospital within two days after the parasites had been first detected on her way to a hill station.

REMARKS.

The embryo had a length of 300 microns, much greater, therefore, than those *Acanthocheilonema recondita* and *A. dracunculoides*, whose reported embryos measure 195 to 230 microns in length. By their measurement these embryos place themselves

between the embryos of *Dirofilaria repens* (300 to 360 microns) and those of *D. immitis*, which reach only 280 to 295 microns. As most of the organisms measured about 300 microns, we are inclined to believe that the species concerned were the embryos of *D. immitis*.

OPERATION FOR PERINEAL HERNIA.

By HENRY TAYLOR, F.R.C.V.S.

Haywards Heath.

HERNIAS in the region of the perinæum are not common. The subject of the photograph had had a swelling in that region for some time which had not inconvenienced the bitch much, but latterly it increased in size and seemed to cause a certain amount of discomfort



Photograph illustrating the exact position of the swelling.

to the animal. The size of the swelling was about that of an orange with a thick attachment or neck. After anæsthetizing the animal an incision was made through the skin in a vertical direction from near the anus to near the vulva. Then came a surprise, for the amount of hæmorrhage was simply astounding, being so profuse that one could not cope with the flow until such a quantity had been lost as to endanger life. The remainder of the operation consisted of the enucleation of the mass, which was comparatively easy, and ligation of the neck; when that stage had been expeditiously arrived at the hæmorrhage was much less profuse. The mass seemed to be solid, and after making sure that the bladder was not implicated it was

excised posterior to the ligature. The skin was sutured and the empty space stuffed with gauze.

The patient was in a state of collapse by this time and for two days was unable to stand, but by appropriate treatment she eventually made a good recovery. For two or three days after the operation there was a fair amount of hæmorrhage from the *vagina*, which was inexplicable, though on examination of the excised mass I found that in the centre of the stump or neck there was a bit of mucous membrane which was apparently from the roof of the vagina.

The mass seemed to be composed of very vascular omentum. The ligature and the tissue posterior to it sloughed away in due course, the wound healed well, and finally the appearance of that region did not differ from the normal.

A NEW IDEA (RETRACTION OPERATION) FOR RELIEVING OBSTRUCTION DUE TO NARROW NASAL ORIFICES.

By F. T. TREWIN, M.R.C.V.S.

Watford.

HAVING on numerous occasions had puppies, especially Pekinese and bulldogs, brought to me with narrow nasal orifices, I decided to try the effect of surgical interference to pull the alæ upwards and thus cause widening. Everyone in canine practice knows the distressing symptoms shown, especially in the short-nosed breeds of dogs and when trying to drink fluids; the bubbling froth which comes from the nostrils upon the slightest exertion and when the head is lowered, especially with liquid or semi-liquid food, some puppies, indeed, being so affected as to become emaciated, and die from inability to obtain proper nutriment. The operation I have tried in two cases, and which has brought about a perfectly successful result, has been to excise an elliptical piece out of the skin just about the wing of each nostril, suturing this together in a similar manner to what is done with the eyelid in entropion. The operation wound has healed by primary lesion and given no further trouble.

In one case the puppy, before operation, had such distressing dyspnoea that it could not even breathe without opening the mouth, and now it breathes normally through the nostrils.

Translations.

THE INTERNAL USE OF LIQUID PARAFFIN, ESPECIALLY IN THE TREATMENT OF INTESTINAL OBSTRUCTION.

By MARQUET.

IN America and England for several years liquid paraffin has been used in the treatment of stoppage, and in France it was used for the first time by Professor Pauchet. In the pure state it is odourless and tasteless and is not changed by alkalies, acids and oxidation agents.

Introduced into the digestive tube it resists the effect of all ferments. Since chemically it contains no fat it is neither attacked by gall nor pancreatic juice and it may be found quite unchanged in the fæces. Incorporated experimentally into the system, as, for example, subcutaneously, it is only quite gradually absorbed, and, according to Cadéac and Meunier, it is then excreted with the urine, and, according to Sobieranski, it is utilized by the system.

In the pure state and in small quantities it causes no poisonous symptoms, only in big doses (65 to 100 grammes) does it occasion vomiting and diarrhœa in dogs.

Properties.—Liquid paraffin has no purgative effect, for it has no chemical action and is not absorbed, therefore it is not in a position to influence the secretions and to stir up intestinal peristalsis to any notable degree. It acts like fatty bodies and has the advantage of animal and vegetable oils in neither being absorbed by the intestinal juices nor changed by the intestinal flora. It permeates the intestinal contents, making them softer, and by lubricating the intestinal mucosa aids its removal towards the anus. Besides this purely mechanical action it acts slowly on intestinal absorption, so that the evacuated fæces is more fluid than is the case normally. If no diarrhœa is present liquid paraffin has the great advantage over other purgatives that it causes no irritant effect on the intestinal mucosa. This is contrary to its action on inflammations of the skin and external mucosæ.

Indications.—Liquid paraffin is indicated for preference in the treatment of stoppage and chronic enteritis. Since it lessens absorption and produces normal evacuations it is useful in chronic

enteritis with a swollen and granulating mucous membrane, strengthening its absorption capacity and restoring its normal condition. It has been successfully used in hæmorrhoids. Robinson praises it even in the treatment of tuberculosis. It may be given to dogs in doses of 10 to 20 grm. daily, an hour before the first feed, until the fæces are passed regularly and normally.—*Académie de Médecine* (Sitting of January 27, 1914).

CHLORAL HYDRATE NARCOSIS IN HORSES.

By H. J. FRIIS.

Veterinary Surgeon, Copenhagen.

IN chloral hydrate veterinary medicine possesses a narcotic with pronounced advantages over chloroform, ether, and morphia, so much so that it is hard to understand why it is not used by a greater number of veterinary surgeons.

All methods of the application of chloral have their drawbacks.

The stomachal application of the drug shows that a marked narcosis can be produced by oral administration, and that chloral hydrate is a very suitable narcotic for veterinary surgery, and in most cases is quite satisfactory.

One thing that militates against its stomachal use is the disinclination of the horse to take the dissolved chloral in the drinking water. The author has had the opportunity of administering chloral to 685 horses, and has compiled statistical data from the results.

The subjects included foals 7 months old and animals 20 years of age. Employment of the drug *per os* was preceded by a period of preparation, in summer twenty-four hours and in winter forty-eight. During this time the horses received only half rations, nothing on the day of operation, and especially no drinking water.

Further, the chloral must be freshly dissolved in a little water and then given to the horse in half a bucketful of water.

The dose varies (according to the breed, size of the horse, length of operation, and time of year) from 20 to 70 grm. (5 to 17 dr.), averaging 40 grm. (10 dr.).

If the horse shows no inclination to drink the solution it may be administered in different ways. Often the horse will only drink if it stands in its usual stall. Many horses take the chloral

better if bran or sugar is added to the drinking water. If the horse will not take the chloral, as happens in from 7 to 8 per cent. of cases, then the drug must be given as a ball or a drench. If it is desired to shorten the time of preparation one may conveniently give the horse small doses of salt.

Statistics show that of 685 horses 503, or 73·4 per cent., took the chloral without difficulty; 105 horses, or 15·3 per cent., took the chloral with the addition of bran.

Altogether 608 took the chloral in the drinking water. Seventy-four horses took the chloral in a ball, 2 in electuary, 1 drank almost all the dose in the drinking water, but received besides a small chloral clyster.

Of 74 horses which would not take the chloral hydrate in the drinking water 22 were not prepared, 7 horses had been without water for twelve hours, 1 horse twenty hours, 30 horses twenty-four hours, 7 horses forty-eight hours, and 7 horses seventy-two hours.

Apart from the 22 unprepared horses, the number of horses which received the chloral in bolus was 52. Well-bred horses took longer to narcotize than heavy and gross ones. The numbers also showed that besides the breed individual idiosyncrasy had its effect.

The method often succeeded even with faulty preparation, but generally in the employment of the drug *per os* drinking water must be withheld at least twenty-four hours.—*Maanedsskrift for Dyrlæger.*

Abstracts.

ON THE TREATMENT OF TETANUS BY MAGNESIUM SULPHATE.

DR. H. STADLER, in an exhaustive treatise on the treatment of tetanus by magnesium sulphate, concludes his article with a series of statistical tables, the final one of which is a comparative summary of the results so far obtained by the various methods of treatment.

He says that it is still too early to state which of the three methods of symptomatic treatment will turn out best, as a sufficient number of cases have not yet come under treatment; but that one great advantage of the magnesium sulphate treatment is that it brings the patient rapid relief from pain.

COMPARATIVE STATISTICS OF THE DEATH-RATE FROM TETANUS TREATED BY
VARIOUS METHODS, COMPILED FROM THE STATISTICS OF THE WRITERS
BELOW MENTIONED.

Inoculation period	Without serum	With serum	With carbolic acid	With Mg. SO ₄ intralumbar injections	With Mg. SO ₄ subcutaneously
I to 10 days	Kentzler 76 per cent. Richter 95 per cent.	Kentzler 52 per cent. Jacobsen and Pease 84 per cent.	Stadler 28 per cent.	Stadler 42 per cent.	Stadler 0 per cent.
Total cases and average death-rate	220 cases 86 per cent.	258 cases 67 per cent.	54 cases 28 per cent.	26 cases 42 per cent.	4 cases 0 per cent.
Over 10 days	Kentzler 44 per cent. Richter 70 per cent.	Kentzler 32 per cent. Jacobsen and Pease 43 per cent.	Stadler 6.4 per cent.	Stadler 9 per cent.	Stadler 0 per cent.
Total cases and average death-rate	166 cases 59 per cent.	186 cases 36 per cent.	47 cases 6.4 per cent.	11 cases 9 per cent.	3 cases 0 per cent.
Total	Kentzler 60 per cent. Richter 85 per cent.	Kentzler 42 per cent. Jacobsen and Pease 70 per cent.	Stadler 18 per cent.	Stadler 33 per cent.	Stadler 0 per cent.
Total cases and average death-rate	386 cases 74 per cent.	444 cases 54 per cent.	101 cases 18 per cent.	37 cases 33 per cent.	7 cases 0 per cent.

RESULTS OF MATING AND THEIR TEACHING.

By A. HINK.

SINCE much of interest from the point of view of zootechny and biology may be learnt from a collective table of covering reports, I am forwarding you those published in a recent number of *Zeitschrift für Gestütskunde* :—

State breeding station	No. of stallions	MARES COVERED			LIVING FOALS			Remarks
		Total	Those pregnant	Per cent.	Total	Horse foals	Mare foals	
Trakehnen (1912) ...	14	400	308	77	287	126	161	Duration of pregnancy: average 338½ days; longest 358 days, shortest 319 days
Braunsberg (1912) ...	167	9,039	6,554	72·5	5,381	2,601	2,780	
Rastenburg (1912) ...	188	11,626	8,010	70	6,879	3,330	3,549	
Brunswick Stud, Harzburg (1912-13))	2 (?)	45	35	78	31	--	--	
Augsburg (1912) ...	95	5,481	2,501	45·6	2,120	1,055	1,065	
Ansbach (1912) ...	116	5,514	?	?	2,627	1,236	1,391	So - called approved stallions
Pfalz (1912) ...	52	2,482	1,300	52·58	1,189	574	615	
Alsace-Lorraine ...	73	5,199	2,384	45·8	2,157	1,022	1,135	
Baden (1911-12)	Belonging to the State							56 per cent. ordinary stallions, 44 per cent. of half-blood stallions used in covering
	120 State supported	7,480	3,572	47·7	3,269	1,603	1,666	
	118	5,605	2,543	45·3	2,157	1,063	1,094	
	943	52,871 - 5,514 Ansbach	27,207	60·5 average	26,097 - 31 26,066	12,610 = 48 per cent.	13,456 = 52 per cent.	
		47,357						

According to this table, at the 9 stations under review one stallion served about 56 mares, certainly a moderate average. In Trakehnen the number was about 29, in Rastenburg 62, in Augsburg 57·7, Ansbach 47·5, Pfalz 47·7, Alsace-Lorraine 71·2 and 62, in Baden 47·5 to one stallion. In Oldenburg a stallion covers on an average 120 to 130 mares, and the East Friesian stallion, Sultan II, covered 315 mares in 1902. A well-kept, mature stallion may cover two mares daily during the mating period. When we consider the percentage of pregnancy we immediately notice that the figure in the North German half-bloods and full-bloods is considerably higher than in South Germany; in the four northern breeding stations the average was 74·4 per cent., in the five southern stations 47·5 per cent. In

the South German stations half-bloods and ordinary stallions were used, in Alsace-Lorraine the latter predominated largely, in Baden up to 55 per cent. It is known that mares of the heavy working breeds come out worse than mares of the pedigree stamp. In the Rhenish-Belgian breed one comes across a pregnancy figure of about 50 per cent. In Oldenburg one reckons on an average of about 75 per cent. The above-mentioned East Friesian Sultan II. covered 2,257 mares in ten years, of which 65·37 per cent. were pregnant. Self-evidently the profitableness of horse breeding depends on the height of the pregnancy figure. It is proportionately seldom that the stallion is to blame for the failure to fructify. The nourishment and care of the stallion in the mating season can doubtless influence potency (especially as regards the energy of the spermatozoa). Then follows the whole art of the breeding of the stallion, his descent, temperament, &c. In the mare there are often breeding, nourishment, and management faults which hinder ovulation and œstrum, and make fruitfulness difficult. Under like conditions indigenous local mares do better than introduced ones. Then, again, the putting of the mare to the horse on the ninth day after the first covering not only has no sense in it, but in certain circumstances may be injurious, as I have previously taken the opportunity of mentioning.

It is of interest to compare the number of living foals with the number of mares pregnant. In one case, from figures omitted from the table, out of 373 mares that became pregnant no living foals were produced—a very high figure. Many mares abort from one cause and another, often preventible; also many foals die in the act of parturition. The treatment of pregnant mares might be better in many places. There is rather a difference in this connection between north and south German breeds. In the northern stations the loss of foals in 14,907 pregnant mares was 2,329, and in the five South German stations in 12,300 pregnant mares there was a loss of 1,408; 15·6 per cent. in North Germany and 11·4 per cent. in South Germany. The pregnant pedigree mares were more susceptible than the others.

As regards sex, the table shows a preponderance of about + per cent. of mare foals. In man (59,350,000 births), according to Oosterlen, there were 100 girls to every 106 boys. According to the German agricultural figures, out of 367,477 calves 48·7 per cent. were males and 51·3 per cent. females, and a similar proportion prevailed with horseflesh.

As regards duration of pregnancy, a 20-year old mare had the longest period—viz., 358 days. In the Prussian and Hungarian State studs the mares went from 333 to 343 days.—G. M.

CIRCULAR RESECTION OF THE TRACHEA FOLLOWED BY PRIMARY SUTURING.

BY DR. JOSEPH MARES.

DR. MARES gives the results of experiments made to remove portions of the trachea by circular resection and to unite the fresh healthy incised surfaces by suturing in order to render the tracheal tube just as normal as it was originally. Mares was induced to make these trials because of the experience that tracheotomy in the horse is pretty often followed by stenosis of the trachea. As material he operated on four anatomy horses and four dogs. After giving the anatomical relations of the trachea Mares discusses the indication, treatment, operation, clinical course, pathological anatomy and microscopic appearances, and comes to the following conclusions:—

(1) The favourable removal of tracheal stenosis may be brought about by total circular resection followed by primary suture of the trachea.

(2) The suture is put through the inner edge in the posterior peripheral half and through the outside in the anterior half of the trachea, button sutures being used.

(3) As suture material iodized catgut is very good.

(4) The operation is performed with the head depressed.

(5) Tracheotomy below the place of operation is not necessary.

(6) In the subsequent treatment fixing of the head and neck in the bent position is advisable and necessary.

(7) With regard to the piece of trachea resected in the horse the maximum number of rings removed was six, which length is sufficient for the most extensive stenosis.

Reviews.

A System of Veterinary Medicine by Various Writers. Edited by E. Wallis Hoare, F.R.C.V.S. Published by Baillière, Tindall and Cox, Covent Garden, London, W.C. 1915. Second volume, royal octavo, pp. xx + 1600. Price of the two volumes, 50s. complete.

For many years the British veterinary surgeon was a long way behind his Continental *confrère* in original works of reference, and depended for his up-to-date literature upon the translations of foreign publications. These were, and still are, excellent, but it was a reproach to the English-speaking world that no one had energy, time, and ability to put on record a volume, or series of volumes, which could find a valuable place in a practitioner's library, and be referred to for the solution of the knotty problems which confront thinking men every day in their desire to overcome disease.

In editing such a volume Mr. Hoare has done wisely to seek assistance, for no one man nowadays can possibly hope to pose successfully as a specialist on every disease to which animals are subject, and to give second-hand knowledge would be to defeat the object in view in bringing out a book like this. To select any special writer or even group of diseases would be invidious, and to take the whole in turn would necessitate far too lengthy a review for any journal. All are good and full of information; information, too, put in such a concise manner as to be of service to, and obviously intended for, the edification of the general practitioner.

For the student, also, it becomes a necessity, and, utilized in conjunction with class notes and his own observation, will decide points of variance and doubt, and set at rest his examination qualms. Bound and well finished, one must give a meed of praise to the publishers, to whom the launching of a veterinary textbook of such a size and length must mean a big outlay, although in this instance there can be no doubt but that it will be repaid, for there is no other work of the kind by British authors; and the editor, when he completed his self-imposed and onerous task of reading so many fairly correct proofs, must have justifiably felt a thrill of pride and gratification in having accomplished a task which he knew must be appreciated by his professional brethren in all English-speaking countries.

The Surgical Anatomy of the Horse. Part IV. By J. T. Share-Jones, M.Sc., F.R.C.V.S. Pp. xx + 260, with 21 full-page illustrations (13 coloured). Price 16s. 6d. net. Published by Baillière, Tindall and Cox, Covent Garden, London, W.C.

Some years ago the first volume of "The Surgical Anatomy of the Horse" was published, and three others have followed in due course, the final volume having just emerged from the press. The idea of the author was to present to his colleagues a work

which would be of especial value for the surgeon, one which would deal in particular with the surgical anatomy of the various regions of the body upon which the surgeon's art was of necessity practised. By means of text descriptions, drawings, and coloured plates the subject is clearly brought forward, and the book is one which is certain to be most helpful, not only to the practitioner but also to the student. The illustrations, in particular, are beautifully executed, and show at a glance the facts desired, and it is of these that the author has made a special point, in which he has amply succeeded.

Anatomical variations are entered into in detail, and in places operations are briefly described.

The work is well bound and finished, and is altogether a valuable addition to our veterinary literature.

The Rhodesia Agricultural Journal, August, 1914. Edited by the Director of Agriculture, assisted by the Staff of the Agricultural Department. Published bi-monthly. Price 5s. per annum. Printed by the Argus Printing and Publishing Co., Ltd., Salisbury, Rhodesia.

This issue of the useful and interesting journal is quite up to the level of its predecessors. The editorial section is chiefly occupied with short notices of agricultural shows, which seem to be pretty prevalent in Rhodesia in the summer months. From the reports we gather that these shows are fulfilling their proper function in causing a healthy competition among agricultural exhibitors and maintaining profitable technical and social advancement. The Rhodes Trust experiments indicate that much useful pioneer work in connection with irrigation, stock-breeding and soil fertility investigations is being carried out by the officers of the Trust. We note that Mr. J. M. Sinclair, Chief Veterinary Surgeon, came over to England for the Congress, and can only express our sorrow that he has not been able to return to our brethren in South Africa with "a feast of reason and a flow of soul," which he would doubtless have gathered from the proceedings of the Congress if fate had not decreed otherwise. From the extracts published in the periodical from his Report we gather that the Veterinary Department which he controls and supervises has been very busy during the year 1913. Outbreaks of African Coast Fever, bovine plasmoses, black quarter, tuberculosis, trypanosomiasis, rabies, and glanders occurred in the colony and were all dealt with effectively by the Department. The Assistant Chief Veterinary Surgeon, Mr. Edmonds, M.R.C.V.S., went to German East Africa to inquire into rinderpest operations as conducted there and attended a Conference at Buluwayo, which discussed his report on the disease. The Veterinary Bacteriologist was away during the year 1913 studying recent advances in veterinary science in Great Britain. During his absence the routine work was carried on by District Veterinary Surgeon Williams, but no special research work was performed.

The rest of the journal is taken up with articles on "The Preparation of Oranges for Market" (well illustrated), contri-

buted by C. E. Farmer; "Concrete and Reinforced Concrete," by E. Hardcastle, M.I.E.E.; "The Manuring of Maize," by G. N. Blackshaw, B.Sc., F.C.S.; and "The Ground Nut or Monkey Nut," by H. Godfrey Mundy, F.L.S. A devourer of maize, the dusty surface beetle, is interestingly written about by R. W. Jack, F.E.S., the Government Entomologist. Work of this description revealing the habits of destructive agricultural pests and how to deal with the evil is always of paramount importance, and we congratulate Mr. Jack on his well-written and well-illustrated article.

We have frequently reviewed the *Rhodesia Agricultural Journal* previously, and can only repeat our expression of praise for the good work it is doing among the thinking and reading agricultural community.

G. M.

REPORT OF THE KENNEL CLUB SUB-COMMITTEE ON VENEREAL OR INFECTIVE GRANULOMATA.

THE Kennel Club Council of Representatives appointed a Sub-Committee to collect information as to the existence and prevalence of venereal diseases amongst dogs, and to report to the Council what steps or regulations the Council should recommend for adoption by the Committee of the Kennel Club, with a view to bringing to the knowledge and attention of the owners of stud dogs, dog breeders, and others, the symptoms of such diseases, and the danger and impropriety of not doing everything to prevent their spread.

The Sub-Committee appointed have held meetings and collected evidence on the subject, and herewith submit their report.

They are specially indebted to many Fellows and members of the Royal College of Veterinary Surgeons, who have either written to them on the subject, or appeared before them as witnesses, and also to several breeders of bulldogs of long standing and great experience.

In many instances the evidence gathered is inclined to be contradictory, and the expert evidence does not agree in every instance with that of practical breeders.

The point which chiefly concerns us, and one which all witnesses agree upon, both expert and practical, is that the disease is by no means as prevalent as it was some years ago. This is accounted for by the fact that breeders and exhibitors are now much more careful of their animals, which are better cared for in every way, and are usually kept under better hygienic conditions.

The mass of evidence goes to show that there is no connection between infective granulomata of the reproductive organs and the papillomatous growths found in the mouth.

The greatest number of witnesses are of the opinion that the disease can only be acquired through actual contact, and some go so far as to express the belief that it is only acquired by bitches when the vaginal mucous membrane is relaxed as in actual œstrum, many experiments to infect bitches not in season having proved futile.

On the other hand, cases are reported by practical witnesses in which the disease has been observed in maiden bitches, and in one case where the bitch in question was the only one kept, and had no chance of being infected by discharges from other dogs or bitches.

It is, however, beyond dispute that the disease is infectious, and that the usual means of transmitting it to either sex is by copulation.

The disease may be easily cured, in most instances, by surgical means.

The Sub-Committee think it advisable that members of the Council should report to members of their clubs: (a) The existence of the disease, warning them that all breeds may be liable to infection, but more especially bulldogs, bulldogs miniature, French bulldogs and pugs, in the order named; (b) that from time to time all stud dogs should be examined, and that no dog should be used should he show any signs of tumour or wart-like growths on any part of the penis or prepuce, more especially at the base of the former; (c) that in every instance all stud dogs should have the prepuce syringed with a non-irritating antiseptic after coition; (d) that in every instance bitches sent for service should be examined, and infected bitches or any bitch which shows any signs of growths inside the vulva should be refused.

Taking into consideration that the prevalence of the disease is on the decline, the Sub-Committee are of opinion that there is no need for the Council to recommend to the Committee of the Kennel Club that they should take any steps in the matter. They consider that anyone allowing a stud dog to be used or sending a bitch for service, knowing that such dog or bitch is suffering from this disease, could be dealt with under K.C. Rule XVII.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.



BRIGADIER-GENERAL JOHN MOORE,
Director of Veterinary Services with the British Expeditionary
Force, France.

THE VETERINARY JOURNAL

FEBRUARY, 1915.

BRIGADIER-GENERAL JOHN MOORE, DIRECTOR OF
VETERINARY SERVICES WITH THE BRITISH
EXPEDITIONARY FORCE, FRANCE.

No man in the profession at the present moment has more serious or greater responsibilities upon his shoulders than the subject of our present biographical sketch, and no man has come through the strenuous ordeal of the war up to the present better than General Moore. General Moore was born on May 24, 1864, fourth son of Mr. John Moore, Longhurst, Northumberland. He was educated at Morpeth Grammar School, and then studied for the veterinary profession at the Royal (Dick) Veterinary College, Edinburgh, where he obtained numerous medals and scholarships, including the Fitzwygram medal. The Army Veterinary Department is a credit to all concerned, and the lay press, as well as the professional papers, are high in the praise of the good work it is doing; and undoubtedly a great deal of this success is due to the man who sits at the helm.

After acting as assistant with various practitioners he entered the Army in 1888, being soon sent to India, where he was attached to the 16th Lancers.

After holding several regimental and remount appointments he was sent on special service to Thibet in the China-Lushai Campaign, receiving for this the Service medal. Again attached to the Remount Department, he acquired an intimate knowledge of the sources from which horses could be obtained for Army purposes in Australia, Canada, and the United States, his knowledge being made the subject of a very interesting lecture before

the Royal United Service Institute, the title being "On Horses of the World and Resources for Remount Purposes."

On the outbreak of war between Russia and Japan in 1904, he was selected and sent with Colonel Lawley (now Lord Wenlock) to make arrangements in the Western Provinces for the establishment of remount depots in case the British were drawn into hostilities. This mission also took him to Mexico, California, Vancouver, and North-West Territory, and it was whilst in the Rocky Mountains that he narrowly escaped death from a snow slide, which swept away the railway line only a few moments after the train in which he was travelling had passed by. After his return to India he was again selected for active service, this time for the Sudan in the expedition against the Mullah, and for this he received the Khedive's medal.

Returning to England he was attached to the 3rd Dragoon Guards and stationed at Dundalk, from whence he was sent on a special mission to the Argentine Republic for remount purchasing purposes, and it was whilst in veterinary charge of the horses on the "Denton Grange" that he had his first experience of a shipwreck, the passengers having to be rescued in surf boats and the horses made to swim ashore, the vessel becoming a total wreck. Attached to General Plumer's force during the South African War, he saw service in Rhodesia and the Northern Transvaal, being mentioned several times in despatches and receiving special promotion.

In 1905, with the rank of Lieutenant-Colonel, he was appointed Inspecting Veterinary Officer of the Eastern Command, thence again to India, and in 1910 back home to take over the Irish Command, where his influence in the establishing of the Officers' Training Corps at the Royal Veterinary College will always be remembered.

In January of last year Colonel Moore was transferred to the Aldershot Command, and when war broke out with Germany was appointed Director of Veterinary Services with the British Expeditionary Force, an appointment which is a most onerous and arduous one, the number of sick and wounded horses now being treated by the Veterinary Corps being quite unprecedented, and a severe strain on both officers and men. The advantages of these hospitals are too well known and valued to need comment, both from utilitarian and humane points of view,

and we have no fear but that when the history of the war comes to be written, the work done by Brigadier-General Moore and the officers and men of the Army Veterinary Corps will find as prominent a place as that allotted to any of the auxiliary departments which work side by side with those whose business it is to "sit tight" and bear the brunt of the actual fighting. Each is necessary to make a success of the whole, and the Army Veterinary Hospital System, in its first real great trial, can truthfully be said to have more than justified its existence.

Editorial.

ETHICS AND SUCCESS IN PRACTICE.

THE ethical attitude of a veterinary surgeon towards his fellow practitioner will be largely a matter of the personal equation. At any rate, in practice a scrupulous man with a well-balanced and discerning mind will always be more ethical than a coarse, inconsiderate, thoughtless being, who puts his own material welfare supremely first and that of the rest nowhere. As a secondary matter, although a right sense of the ideal practice of the principles of human morality and duty is primarily an inherent faculty not possessed in a like degree by every man of the same profession, yet a good all-round education ought to be a helpful safeguard against indulging in the sharp practice and petty meanness which the unscrupulous practitioner displays towards his professional neighbour. Hence we thoroughly believe in keeping up the standard of general and professional education in our ranks. The frequent objectionable attitude of some tradespeople towards each other, or of one showman to a rival, ought not to appeal to us, for there we see that badly educated or half-educated folk understand nothing about ethics.

So we often find that many of the flagrant breaches of professional etiquette committed by one member of our body against another are the acts of elderly practitioners who never received any deep or proper education. Let us "leave age its subtlety and grey-haired policy its mane of falsehood," assured that we neither hope to meet now nor hereafter.

Yet the faulty display of a proper professional spirit is not limited to elderly men altogether, and we have known in our time subjects that have acted as pupils for three or four years to practitioners who, after qualifying and having learnt all they can, including a complete knowledge of their principals' clients, have set up in practice within a stone's throw of them and solicited all their former principals' customers. The pupil cannot be bound out like the assistant, or, at any rate, it is seldom done. Such procedure as we have indicated can only be described as about the lowest form of professional poaching, and no ethical consideration should be given to such a man by his neighbouring professional workers. But still we often find that this renegade is aided and abetted in his operations in the same town or countryside by a rival practitioner of the principal where the sinner served his pupilage. The facts disclosed at the recent Council meeting point to a very low standard of conduct on the part of some of our members.

As regards starting in practice where work is plentiful and labourers few, there are legitimate ways of doing this which appeal to fair-minded men. Blatant advertising ought, of course, to be officially tabooed, but taking part in social work, or obtaining an official position with a governing body, or to a company, suggest themselves as ways in which a young man can bring himself into prominence. A bare announcement to the public that a man is qualified to practise can only be considered an appropriate and common-sense measure, and one of the best ways of doing it is to send a card with name, degree, telephone number, and address printed on it to all those people who possess stock, and to whom the graduate thinks he may be useful. At the same time, we consider that by far the best way to start in practice is to buy that vacated by a deceased, retiring, or removing practitioner. There will be a tendency for professional etiquette to be better observed in this case than the other.

How is success in practice attained, and how ought it to be acquired?

The answer to the first question will probably depend on a man's point of view. One reply will be that success depends upon the amount of wealth accumulated. Another will be that the successful practitioner is he who achieves the best results in the treatment of his cases. Hence it follows that the man with

a small practice who gives plenty of time and trouble to his charges may be really more successful than the practitioner with a large run, a rich *clientèle*, and a fat bank balance.

We have known men who might be described as successful practitioners who have acquired their positions by very shady means. They have even taken contracts on from rival practitioners before proper notice of the termination of the contract had been given to the original holder, and no fault whatever had been found with him. In this connection we should like to see a case taken to law to determine what notice a practitioner who takes a contract at a fixed sum per horse per year is entitled to before the contract is terminated, and what compensation he should receive in lieu of proper notice. We have never read or heard a judicial decision on this point.

One word on the second question we asked, viz.: How ought success in practice to be acquired? The answer is by energy, ability, business habits, tact, and hard work; but, above all, the man who desires to practise ethics (and in a noble profession we all ought to do this) will obtain work only in a fair, just, and legitimate manner.

We have often thought that a short course in the science which treats of the principles of human morality and duty might be advantageously included in our professional curriculum. The recent discussion at the meeting of our governing body would seem to prove it. We feel sure that if this were done it would in the future react beneficially on the veterinary profession.

General Articles.

FOOD FOR THOUGHT.

By ERNEST J. BURNDRED, M.R.C.V.S., D.V.H.

THE public abattoir is an excellent place for showing the pathological student the wonderful recuperative power of Nature and also some of her vagaries, and at the same time it shows him his own limitations. I have often been struck by the enormous damage done to the flesh of an animal by the bumping and bruising caused by a railway journey, and yet before slaughter the animal has appeared in perfect health.

In other cases where slaughter has not taken place for some time after the journey the reparative processes can be seen. The vagaries of Nature in carrying out pathological processes seem to merit more attention than they get.

Why is tuberculosis comparatively rare in the bullock, but when present it is often generalized?

Tuberculosis in cattle is a disease full of interest, and *post-mortem* examinations often furnish surprises. I have seen cows, for instance, which were obviously very badly affected with tuberculosis, but having no apparent lesions of the udder. Biological examination of the milk has been negative, confirming the clinical examination of the udder, but *post-mortem* examination has shown the carcass to be badly affected with tuberculosis, especially the mesenteric lymphatic glands and the peritoneum.

On the other hand, a cow which is apparently in good health is found to have a pronounced induration of the udder, and microscopical examination of the milk shows tubercle bacilli present. *Post-mortem* examination of the carcass shows probably tuberculosis of the lungs and bronchial and mediastinal glands, and maybe one or two centres of caseation in the mesenteric glands, but the rest of the carcass is apparently free. These two types of cases are quite common with me, but what is the explanation of them?

I particularly remember the milk of a farm being tuberculous, and an examination of the herd showed no cows giving any clinical indications of tuberculosis of the udder. It was found necessary to group and re-group until the milk of an individual cow was infective to a guinea-pig.

I once had a cow which was known to be giving tuberculous milk. She was a splendid-looking animal, the picture of health, and, of course, the farmer ridiculed the idea of tuberculosis. I made a most careful clinical examination of the udder, but failed to detect any induration. The cow was slaughtered, and *post-mortem* examination showed the pharyngeal glands much enlarged and caseous, one small caseous centre in mesenteric glands and very slight tuberculosis of the peritoneum covering the bowels. This investigation lasted six months, and yet at the end of that time there was no clinical evidence of tuberculosis of the udder. I know it is a common experience to get a positive milk when clinical examination shows apparent freedom of the udders, but usually a second visit in one month's time shows a cow with well-marked induration of the udder.

It seems, therefore, certain that there is a great difference in the individuality of tubercle bacilli, as also in the animals affected, and that sometimes tubercle bacilli gain an entrance to the animal's system during a period of lowered vitality, but cannot do more than maintain their existence when the animal regains its normal health. In view of the great headway which auto-genous vaccines are making, the following cases are to my mind instructive:—

(1) Cow brought in for emergency slaughter with a "wry" neck. On *post-mortem* examination the lesions of tuberculosis found were: Tuberculosis of the first cervical vertebra and the lungs, carcase otherwise free.

(2) *Post-mortem* examination of carcase of cow showed tuberculosis of sternum and lungs, carcase otherwise free.

(3) Carcase of pig. Bronchial glands showed tuberculous deposit. Examination of glands of carcase, including head glands, were negative, but an abscess in the intermaxillary space proved to be tuberculous.

These cases seem to show that there are places in an animal's body which can be called "drainage centres" which attract the tubercle bacilli from the surrounding areas.

These are a few points in the pathology of tuberculosis which mystify me, but there are many more:—

Why does tuberculosis usually attack one quarter of the udder, preferably a posterior quarter?

Why do we sometimes get diagonal infections of a carcase,

that is, tuberculosis of the left parietal pleura and right parietal peritoneum, other times just tuberculosis of one or both pleuræ or peritoneum?

I know that there is a lymphatic circulation which seems to be imperfectly understood, but these results are so irregular that if they could be explained much might be cleared up.

A most important case of tuberculosis which I should have mentioned in connection with "drainage" occurred in a cow on a dairy farm. I saw this beast about a week after purchase, and on examination of the udder found an induration at the supero-posterior part of the left side, which might have been a much enlarged supra-mammary lymphatic gland. I took a sample of milk and examined it microscopically, but failed to find tubercle bacilli.

Biological examination of the milk was negative, and on several subsequent occasions microscopical examination was negative. I told the owner that the case was interesting and I should like to see the carcase. He agreed to send it to the abattoir, which he did about two months later. The animal had grown well in the meantime. *Post-mortem* examination showed tuberculosis of the lungs and pleura, mesenteric glands, and a large tuberculous abscess in the connective tissue immediately above the udder.

It appeared to me in this case that the abscess had saved the udder from infection. At the same time I had a sense of false security from the result of the biological test, because at any time the infection might have progressed and invaded the udder.

MORTALITY AMONGST CATTLE IN THE BEGA DISTRICT OF NEW SOUTH WALES.

By MAX HENRY, M.R.C.V.S., B.V.Sc.Syd.

DURING the years 1907 and 1908 the writer was stationed in the district referred to for fifteen months as a veterinary inspector under the Board of Health, the work carried out being the inspection of dairy cattle for manifest tuberculosis, actinomycosis and cancer, of pigs for manifest tuberculosis and swine fever, and of dairy premises and slaughter yards with regard to sanitation and cleanliness; whilst a certain amount of inspec-

tion of carcasses for human consumption was performed at each centre. As over 90 per cent. of the farmers in the district are dairy farmers and had all to be visited, the work provided an excellent opportunity of becoming acquainted with the various diseased conditions found amongst the stock, the methods of farming employed, and the general carrying capacity of the country. As the district comprised all types of country, from rich alluvial flats to starvation country (which, except in the best of seasons, is all but useless for grazing purposes), the effect of the different types of country on the stock running thereon could be well observed: and although the most important part of the district was coastal there was attached to it, for administrative purposes, a large area of tableland country which furnished a good contrast.

Although so largely a dairying district, very few of the cattle receive any feed beyond what they obtain by grazing; and though this answers well in good seasons and on the richer lands, the cattle are naturally subjected to considerable ups and downs of condition as the seasons vary. On a few farms maize silage, pumpkins, and lucerne chaff and bran are fed regularly, on others maize and sorghum are grown and fed in the green state to cattle; but, generally speaking, very little of such feed is given. The district is an old-established one and has been grazed continuously and for several decades by milking cattle. Very little artificial fertilizer is used on crops and none on grass, and naturally, under the conditions in force, the best cannot be made of the farmyard manure, as the cattle are never housed. Still, the district was for many years renowned as a rich dairying district. At this time, although the rabbit pest was serious on the tablelands, it was only just beginning to make itself felt on the fringe of the coastal lands at the foot of the mountains.

During the whole period osteomalacia [1] amongst the coastal cattle was frequently observed, and it was soon noticed that the habit of bone-chewing and the occurrence of osteomalacia was largely confined to certain fairly well-marked areas within the district, but was never seen on the tablelands. The administration of bone-meal licks and the provision of a more generous ration was noted to have a beneficial effect as regards this condition. No mortality such as is about to be described was met with nor were any similar cases heard of.

In the early part of 1912 information was received that cattle were dying of some unknown complaint in the district, and the district stock inspectors were instructed to make a preliminary investigation. Their reports showed that a fair number had become affected by this complaint about the same time on a well-marked group of farms, that most of those affected died, and that the mortality ceased suddenly on the fall of rain. It was also noted that the district was going through a period of drought and that rabbits were swarming into the district from the waste lands.

In February, 1913, a wire was received from the district stock inspector stating that the complaint had recurred. On arriving in the district it was found that it had passed through a severe winter the previous year, when many head of cattle had died of starvation. The spring had been fair but the summer was again dry, and at this time what grass was left was in a dry and innutritious state. Rabbits were found to have increased enormously during the few preceding years, so much so that farmers were commencing to wire net the holdings, and the only feed worth calling such was within the netted paddocks. It is difficult for anyone without practical knowledge of the matter to realize what severe rabbit infestation can do in the way of lowering the carrying capacity of country and of keeping down the better and more nutritious grasses, leaving only the coarse indigestible grasses for the cattle. In some parts the ground was almost eaten bare by them, and the country immediately at the foot of the mountains whence the infestation had come had been abandoned as far as dairying was concerned.

The affected areas were found to be well defined, included the area affected in 1912, and somewhat more of the country as well. The cattle in certain areas of this country, as has been noted, are marked "bone-chewers," and that habit has been extending to what are regarded as medium lands. The better class of country is still quite free, and no mortality such as was being investigated had occurred on this class of country. This outbreak ceased abruptly when rain fell a few days later, although, as would be expected, cattle already affected and some few others died within a few days immediately after the rain.

As was expected, the early part of 1914 saw a recrudescence

of the complaint, although the intervening period had been practically free, and in March the district was visited again. This year mortality had not been so heavy, but was more widely diffused, the good lands, however, remaining quite free. The previous spring had been very good in the early parts and a splendid growth of grass resulted, but since then the season had been very dry and the grass, where it had not been eaten down, was extremely dry and crumbled to dust in the hand. Much more of the country was wire netted and the resulting benefit in netted areas was plainly visible. As usual, the mortality ceased on the fall of heavy rains in the latter end of March.

The state of affairs on the farms on which the principal investigations were carried out was as follows:—

Farm A.—Area, 350 acres. In 1913 stocked with forty cows, ten horses, and fifty sheep. Ten cows died. Cattle have shown depraved appetites for the last two years. They are grazed, as a rule, but a little green maize was fed lately and the severity of the complaint and mortality have since diminished. In 1914 losses were lighter. Not netted. No artificial fertilizer used.

Farm B.—Area, 706 acres. In 1913 stocked with eighty-five head of cattle besides horses. Thirteen cows died in 1913, nine died in 1912. Cattle grazed as a rule, but since feeding on green maize in addition severity and mortality have decreased. In one lot of cows fed principally on maize no deaths occurred. Depraved appetite noted during the past four years. In 1914 remedial measures were taken and the complaint was practically absent.

Farm C.—Area, 800 acres. Stocked in 1913 with 105 cattle besides horses. Lost in 1912 thirty head, in 1913 twelve head. Depraved appetite noticed for years and animals affected with osteomalacia for many years. This was one of the worst farms. In 1914, after netting and feeding, very little loss was experienced.

Farm D.—Area, 300 acres. Carries 100 head of cattle. In 1912 fifty head died. The farm was then netted, the cows fed to a fair extent on maize silage and a bone-meal lick provided. Crops were manured with bone-dust and the following year (1913) no cattle died. In 1914 no cattle were lost on the farm, but two turned out into the scrub died, so it is said, from this complaint.

This farm is right in the midst of the worst affected area, is of the same class of country, and, as can be seen, is heavily stocked.

Farm E.—In the midst of affected country. Cattle suffered from osteomalacia and had depraved appetites. Lost heavily in 1912. Then commenced to feed on a little bran and returned the skim-milk to the cows mixed with a little molasses as a drink. Lost none in 1913 or 1914. For sleekness of coat, healthiness of skin, brightness of eye, and appearance and general condition these cows compared most favourably with any seen. The depraved appetite had left them.

Many other similar histories could be quoted, but all follow one of the above examples, and it is to be noted that in practically every instance where disease was absent or less in 1913, 1914, or both, and was present in previous years, that some steps had been taken to render the food supply available for individual animals better than before. In some cases this was merely the result of previous mortality without re-stocking, whereby the farms became far less heavily stocked, but improvement in these cases was never of equal value to that observed where the holdings had been netted in and feed supplied.

INCIDENCE.

As has already been pointed out, the mortality was markedly localized; it was also seasonal in that it has during the three past years occurred at the end of a dry summer. The cattle affected were in the vast majority of instances cows in full milk; in only a few cases, and those on areas of poor country where the mortality and severity of the disease were exceptionally great, were cattle other than milking cows attacked.

It must be noted that concurrent with the deterioration in pastures there has been a steady attempt, by the importation of Jersey bulls and in other ways, to increase the average milking capacity of the cattle.

The mortality was more especially confined to good milking cows. One instance was noted of a farm free from the disease, in the midst of affected ones and on similar country, the cows on which were notorious through the district as being "scrubbers" and of poor milking capacity, no effort being made by the farmer to improve the quality of his cattle.

SYMPTOMS.

The cattle on the affected farms all suffer from a depraved appetite: they chew bones, sticks, and dead rabbits, lick up the rabbit dung, and eat indigestible and astringent plants. The coat is rather dry and harsh, the animal stands with a general dull, heavy appearance, and tucked up. Loss of condition is fairly rapid. Lactation ceases with some suddenness, rumination is partly or entirely suspended, appetite poor or absent. Bowels usually constipated, fæces being passed in small quantities, often with blood and mucus. Diarrhœa may be present at times. Evidence of dull abdominal pain may be noticed. The animals move stiffly; when down they rest on the sternum, but towards the end lie stretched out on one side. They are often unable to rise. The tongue is in most cases protruded and salivation generally marked, the muscles of mastication and deglutition being paralysed. The rumen is full and doughy, and whole alimentary tract markedly atonic. Tympanites not marked. Temperature varies from normal to 104° F.; breathing somewhat hurried and apt to be stertorous.

Death occurs in from twelve hours to a week or fortnight after symptoms are first observed, but in more than a few cases of reported sudden death careful inquiry revealed the fact that the animal in question had not been milking quite so well as usual for a day or two and was somewhat off colour. Cases lasting more than a few days present an unthrifty dull appearance, stiffness of motion, stand about picking occasionally at grass, ruminating but little, and fall off in condition. Recoveries are not common.

POST-MORTEM APPEARANCES.

Generally speaking, these may be said to be inconstant and indefinite.

No lesions of the skin, subcutaneous tissues or musculature are observed beyond occasional bruising in parts, and slight œdema of connective tissues. The peritoneum may contain a somewhat excessive quantity of clear fluid, but it is not present in marked quantities. The liver may be slightly pale and the gall-bladder is usually very full, but contents normal.

The rumen is usually full, often with a somewhat dry felted mass of indigestible fibre, and there are always present foreign

substances, such as bones, sticks, bits of rabbit skin, rabbit dung, china, &c. The omasal contents vary, in long-standing cases being excessively dry, but in many other cases practically normal. The abomasum may be slightly or even markedly congested, and in a few cases there is some catarrhal enteritis. The small intestine is generally empty, the large intestine containing a normal amount of food often rather on the dry side. Mesenteric and other lymphatic glands somewhat cedematous at times. Kidneys normal. Thoracic and pelvic viscera normal. Carcase poor to fair, generally deficient in fat.

ETIOLOGY.

Before dealing with what would appear to be the essential cause of this mortality it may be as well to review other theories either held locally or suggested for similar mortalities elsewhere.

The theory of infection occurred naturally to the farmers, but would appear to be negatived for several reasons. The affected district is bounded on the west by the tablelands, on which the disease does not occur, and on the south by a large area of forest land. Very few cattle are introduced, though many are taken overland northwards; the affected areas are scattered throughout the district, although interchange of cattle is fairly general. Cattle on affected farms are often removed deliberately on to non-affected areas when mortality amongst such herds ceases and the cattle with which they are mixed do not contract the disease. Mortality ceases on the fall of rain and is apparently prevented by improvement in feeding. Bulls and steers and young stock, in the vast majority of cases, remain unaffected in affected herds.

Examinations of blood by the Bureau of Microbiology were negative.

The theory that the loss was due to the cattle picking up the poison baits laid for rabbits had wide support, but as neither the symptoms nor *post-mortem* appearances were those of phosphorous poisoning (phosphorus being the poison used), and mortality had occurred on farms where no poisoning had taken place, the idea may be dismissed.

Examination of the pastures failed to reveal the presence of any known poisonous plant, nor had the farmers observed any new or strange plant to be growing, whilst identification

of the commoner grasses and plants by Mr. J. H. Maiden, F.L.S., of the Botanical Department, showed that nothing suspicious was amongst them.

The possibility of a fungus on the grasses being implicated was considered, but the report of Mr. G. Darnell-Smith, B.Sc., Plant Pathologist, showed that on large mixed samples from affected and unaffected farms "no fungus parasite was found to be constantly present, and the fungi detected were for the most part saprophytic and such as one might expect to find on almost any pasture." Moreover, any present on affected farms were also present on unaffected ones.

He identified spores of *Ascochyta*, *Fusarium*, *Septoria*, and *Sphæropsis*.

In investigating this mortality it could not but be noted how localized it was, and how markedly it coincided with those areas whereon "bone-chewing" and osteomalacia had previously been observed, whilst the experience of many farmers as to the results of feeding drew attention to the need for investigating the food supply.

It was known that soil analyses had been carried out throughout this district, and the following analyses are of interest:—

ANALYSES (TWO) OF GRANITE SOILS, BEGA DISTRICT, N.S.W.

Locality	Colour	Reaction	Water capacity percent.	Capillary power	Clay per cent.	Lime per cent.	CaO per cent.	Potash K_2O per cent.	Phosphoric acid P_2O_5 percent.	Nitrogen N per cent.	Volatiles per cent.
1. A .....N	Grey	Acid	35.5	6	34.5	0.225	0.023	0.070	0.154	8.20	
2. P .....N	Light Chocolate	"	36.5	8	34.9	0.616	0.417	0.152	0.364	10.98	
3. W.....N	Grey	"	36.0	6½	29.9	0.271	0.112	0.109	0.168	7.57	
4. N.....N	Light	"	34.0	5	36.2	0.566	0.341	0.157	0.238	9.86	
5. S.....N	Grey	"	23.0	3½	44.5	0.118	0.101	0.070	0.126	5.52	
6. D.....B	Dark	"	41.5	8	30.0	0.340	0.314	0.140	0.196	8.40	

In locality 5, corresponding with Farms C and D, mortality was very heavy; in locality 1, also corresponding to these farms, mortality was heavy; in locality 3 there was very little sickness; in 4 and 6 none whatever; whilst locality 5 was largely used as an area into which cattle from affected herds were taken to recover, and in this locality no disease was seen.

It will be observed how the mortality coincided with poverty of soil, especially of lime, phosphates and potash.

In order to note what influence this state of affairs might have on the actual feed samples of grasses were taken from

four affected farms and two unaffected, large bundles of mixed grasses being taken in each case.

Analyses (three) resulted as follows:—

Distinguishing marks	...	...	A1	A2	B1	B2	C1	C2
Moisture, per cent.	...	...	9'44	9'11	9'43	9'68	9'91	9'59
Ash, per cent.	...	...	6'41	13'0	10'62	10'82	10'9	9'37
Containing lime (CaO)	...	...	0'33	0'34	0'42	0'44	0'41	0'42
„ magnesia (MgO)	...	...	0'15	0'15	0'17	0'17	0'21	0'19
„ potash (K ₂ O)	...	...	1'02	0'72	0'93	1'05	1'48	1'53
Phosphoric acid (P ₂ O ₅)	...	...	0'27	0'24	0'30	0'30	0'56	0'56
Silica (SiO ₂)	...	...	3'97	10'55	8'03	8'06	7'35	5'55

Of these grasses A1 and A2, corresponding to localities 1 and 5 and Farms C and D, are from badly affected areas, where mortality was heavy; B1 and B2 corresponded with Farm A, where also mortality was heavy; C1 and C2 corresponded with localities 4 and 2 respectively, on which no mortality occurred.

If these analyses are studied it will be noted at once how the phosphoric acid content varies in the unaffected areas C1 and the affected A1 and 2, B1 and 2.

The principal grasses, as identified by the Government Botanist, Mr. J. H. Maiden, were:—

A1. *Festuca bromoides*, *F. ciliata*, *cragrostis* sp.

A2. *F. bromoides*.

B1. *Sorghum plumosum*, *F. bromoides*.

B2. *F. ciliata*, *Poa cæspitosa*.

C1. *F. myuros*, *F. ciliata*, *Bromus mollis*, *P. cæspitosa*.

C2. *F. myuros*, *F. ciliata*, *P. cæspitosa*.

There would thus appear to have been a definite connection (1) between soil poverty and food poverty, (2) between food poverty and the mortality.

The whole course of the disease is found to simulate very closely one form of the disease known as “lamziekte” in South Africa, and that known as “impaction paralysis” in Victoria and South Australia. The disease described by Robertson [4] would appear to answer almost exactly to these outbreaks. It has been argued by Theiler [5] that the disease as seen in South Africa is due to a toxin of vegetable origin, although many objections to this theory have been raised, more especially by Stead [6], whose arguments appear worthy of every consideration.

Juritz [7] has pointed out the importance of the absence of the organic compounds of phosphorus as a controlling factor in

the production of beriberi and polyneuritis, and suggests that the important deficiency may be that of nucleo-proteins, whilst Stead, in writing of lamziekte, says, "whether killed by sudden drought or frost, lamziekte grass is certainly most deficient in respect of P_2O_5 or substances which it manufactures by its acid, which substances are presumed to be of vital import to the animal." Further, in mentioning the possibility of a vitamine being concerned, he says that "milk contains a substance that possesses protective properties."

It has been shown that the amount of protective substance in rice is extremely small, and it can readily be understood that relatively small quantities of certain foodstuffs may be able to ward off other diseases due to deficiency. If it be assumed that milk contains the protective substances which can ward off the mortality, then the extraordinarily strong preventive value of returning relatively small quantities of skim milk to the cows, as was so markedly observed, can be explained, but it is difficult to explain on any other basis.

Theiler [8] asks "If something is missing, how can an animal recover after it has sickened without that something be supplied?" But it is noted, both in South Africa and here, that cessation of lactation is most marked, and consequently the valuable substances which were being passed on to the calf through the milk are retained for the use of the animal itself, for as Stead has well pointed out, the composition of milk is not affected by diet, so that the calf should not suffer at the expense of the mother. This received confirmation in one case during the outbreaks under review, wherein a large herd of cows, all suckling their calves, became affected and heavy mortality occurred, but on weaning mortality rapidly ceased.

CONCLUSIONS.

(1) There exists in an isolated district of New South Wales a disease closely simulating lamziekte and impaction paralysis.

(2) This disease is markedly associated with soil deficiency in lime and phosphate and subsequent food deficiency in phosphates.

(3) The disease occurs at the end of droughty periods in country much depreciated by rabbit infestation.

(4) The distribution of the mortality coincides with areas on

which "bone-chewing" and osteomalacia have been for some time present.

(5) Great benefit is obtained by feeding small quantities of nutritious food, and especially by returning skim milk to the cows.

(6) Milk probably contains a substance that possesses protective properties.

(7) The idea that a deficiency of phosphates is the ultimate cause, either directly or through want of substances containing them, of the diseases known as lamziekte and impaction paralysis would appear to be supported.

In submitting this report I must acknowledge the assistance received from the officers of the Department of Agriculture mentioned here, and more particularly from Mr. C. Furness, Inspector of Stock, Eden P.P. District, who was indefatigable in obtaining information, collecting material, and generally assisting in the investigations carried out.

REFERENCES.

- [1] HENRY: "Osteomalacia in Cattle in New South Wales," *Agricultural Gazette of New South Wales*, October, 1912.
- [2] H. T. JENSEN, D.Sc., *Agricultural Gazette of New South Wales*, December 2, 1909.
- [3] I am indebted to Mr. F. Guthrie, F.I.C., for these analyses.
- [4] *Agricultural Journal, Union of South Africa*, October, 1913.
- [5] "Facts and Theories about Stilzi-kte and Lamziekte."
- [6] "Some Chemical Reflections Concerning Lamziekte," *Agricultural Journal, Union of South Africa*, March, 1913.
- [7] *Agricultural Journal, Union of South Africa*, November, 1913.
- [8] *Ibid.*, July, 1912.

A REPORT UPON SOME CASES TREATED BY VACCINE THERAPY IN VETERINARY PRACTICE.

By J. F. D. TUTT, M.R.C.V.S.

Winchester.

(a) AUTOGENOUS VACCINES.

(1) *Subject*.—Hunter mare.

Disease.—Open suppurating tendon sheath. *Micro-organisms present*: (1) *Staphylococcus pyogenes albus*; (2) an irregular streptococcus of uncertain species. Professor Annett, of the Runcorn Laboratories (Messrs. Evans, Lescher and Webb), prepared a vaccine from a swab of the material taken from this case, made up in six phials, each phial containing 1 c.c. (3,000 million of staphylococci, 2,000 million streptococci being in each phial).

1914.—May 2, initial dose, $\frac{1}{2}$ c.c.; May 6, second dose, 1 c.c.; May 11, third dose, 1 c.c.; May 16, fourth dose, 1 c.c.; May 23, fifth dose, 1 c.c.

Result.—Complete recovery followed.

(2) *Subject*.—Cart horse used for town work in corn merchant's van.

Disease.—Chronic nasal discharge. *Organisms present*: (1)

Streptococcus brevis; (2) *Micrococcus catarrhalis*; (3) a club-shaped bacillus (probably *Bacillus septus*); (4) *Staphylococcus albus*. Dr. Annett prepared six phials from a swab of the discharge; each phial, as before, contained 1 c.c., and each contained 4,000 million organisms, made up of 1,000 million of each organism specified.

1914.—July 10, initial dose, $\frac{1}{2}$ c.c.; July 28, second dose, 1 c.c.; August 10, third dose, 1 c.c.; August 17, fourth dose, 1 c.c.; August 24, fifth dose, 1 c.c.; August 31, sixth dose, 1 c.c.

Remarks and Result.—No appreciable improvement was noted until the third dose. The discharge gradually diminished after the third injection, and has not appeared since.

(3) *Subject.*—Cart horse used on farm.

Disease.—Chronic nasal discharge. *Organisms present:* (1) *B. coli*; (2) a diphtheroid bacillus; (3) *Staphylococcus albus*. Dr. Annett prepared a vaccine of these organisms, and, as before, sent six phials, each containing 1 c.c. (6,000 million organisms in each phial, being 2,000 million of each of the organisms specified above).

1914.—October 16, initial dose, $\frac{1}{2}$ c.c.; October 23, second dose, 1 c.c.; October 30, third dose, 1 c.c.

No more injections were given, as the owner decided that the animal was not worth treating further, although an appreciable improvement was noted after the second injection. The turbinal bones of the right nostril were extensively diseased.

STOCK VACCINES.

Although not considered so efficacious as autogenous vaccines, I have had most excellent results in using the hypodermic tablets prepared by Messrs. Parke, Davis and Co.

In a pamphlet issued by the Runcorn laboratories, the advantages and disadvantages of stock vaccines and autogenous vaccines are compared thus:—

A stock vaccine can be compounded of strains of organisms of proved immunizing properties, but failure is frequent. An autogenous vaccine gives the best guarantee that the anti-bacterial substance produced will be the most efficacious, therefore risk of failure is minimized.

Stock vaccines are less expensive. Autogenous vaccines are initially more costly, but a large quantity is prepared as easily as a small quantity, and hence a long course of treatment may prove less expensive than a course of stock vaccines.

A stock vaccine is immediately available for use in urgent cases, and is often available in cases where it is not possible to isolate the infective organisms directly for the preparation of an autogenous vaccine. An autogenous vaccine requires some time (thirty-six to forty-eight or more hours) for its preparation.

Stock vaccines deteriorate by keeping. Autogenous vaccines ensure freshness of preparation.

Stock vaccines are made from several different strains of organisms presumed to be the cause of the lesion—they are polyvalent—but still may lack the particular strain or variety of the

organism causing the lesion. *Autogenous vaccines* contain the organisms concerned.

This last point is perhaps the strongest in support of the superiority of autogenous to stock vaccines.

(1) *Subject*.—Pony used in trap and for children to ride.

Disease.—Fistulous withers (second year in succession).

Treatment.—Case was seen on November 21, 1914, the near side wither being very enlarged. I laid this freely open with the knife, and thoroughly curetted and cleansed the interior with weak Jeyes' fluid and water. Hypodermic injection of one tablet (Parke, Davis) of streptococcus vaccine (*streptococcus bacterin: S. pyogenes*), representing 100 million bacteria. The off-side wither was at this point quite normal. I make a note of this, as it will be seen later that this latterly became involved.

1914.—November 30, Two tablets (200 million) given hypodermically, discharge gradually diminishing; December 5, wound gradually healing; December 10, four tablets given, off wither assuming character of near; December 11, off-side wither opened and disinfected as in case of near; December 17, five tablets administered; December 21, going on well. Further dose of five tablets given; January 1, discharged cured.

Remarks.—In conjunction with vaccine treatment, ovules of vetiod were inserted every day (an ovule per day), and latterly perchloride of mercury points (Willows) one every other day.

Although the dose was gradually increased, I do not always follow this practice, very often starting with a large dose of 500 million organisms and with the same beneficial results.

(2) *Subject*.—Mare used in butcher's trap.

History.—Had recently had an attack of lymphangitis, and a *knowledgable* (?) farrier had bled from the foot; infection followed, and septic infection of the leg resulted.

Treatment.—December 11, 1914. The mare was in great pain. There was a nasty wound discharging pus to the inner side of the point of the hock of the near hind limb. Hypodermic injection of one tablet (100 million organisms: Parke, Davis), streptococcus vaccine, and $\frac{1}{2}$ oz. doses of potassium iodide three times a day in the drinking water. December 14.—Wound still discharging pus, with a secondary wound discharging pus and blood 3 in. below the point of the hock. Two tablets of vaccine given. Pot. iodide continued as before. December 18.—Appreciable diminishing of swelling of limb. Appetite good. Temperature normal (on the 11th it was 103° F., and on the 14th 102.8° F.). December 21.—Five tablets given; discharge diminishing from both wounds; second wound showed signs of healing. December 29.—Second wound healed, first wound gradually assuming a healthy appearance. January 1, 1915.—Wound granulating. Dusting powder applied d.p.d. January 4.—Wound cauterized to reduce "proud flesh." January 7.—Wound practically healed. January 12.—Discharged *cured*.

The value of vaccine treatment is undoubted. Few as are the cases recorded, I hope shortly to publish a more exhaustive list of cases treated by stock and other vaccines.

Clinical Articles.

LAMINITIS—THE VALUE OF READING AND A MORAL.

By G. MAYALL, M.R.C.V.S.

Bolton.

ON November 10 I was called to see a bay horse of the van type, 7 years old, suffering from laminitis in the fore feet. I administered a laxative dose of aloes and had the shoes removed, the feet pared, and warm bran and linseed poultices put on. The horse was blowing, the respirations about 30 per minute, an anxious expression of the face, pulse 60, temperature not raised. On my visit next day the animal was easier generally, but the feet were very tender, and it was with difficulty that the horse could rise, and when he was up he shoved his fore feet out and almost fell on top of us if one of the fore feet was lifted up. I prescribed pot. nit. in $\frac{1}{2}$ oz. doses, together with B.P. tincture of aconite 30 minims, three times daily.

After a week's treatment with laxatives, diuretics and febrifuges, and continuous poulticing and paring the soles of the feet thin, there was not any marked improvement in the case, but now large elevations of the skin, similar to those seen in cases of urticaria, developed about the croup and buttocks of the horse. At this time I changed the warm poultices to cold ones, administered a purgative dose of medicine, and ordered the application of lead and carbonate of potash liniment to the nettle-rash elevations.

Next day but one the blebs had disappeared, but the laminitic condition was no better. Briefly, poulticing and febrifuge medicine were continued until December 22, when the horse had improved slightly, but still seemed like a subject suffering from chronic laminitis. Thinking that there might be some rheumatic condition present I now began to administer large doses of acid aceto salicyl (3 drachms), but still no visible improvement occurred and I was beginning to fear I should have to adopt the adrenalin or pilocarpine treatment, or one of the other lines recommended, but all of which are objectionable from a contract point of view.

It was about at this time that I chanced to drop across a copy of the *American Journal of Veterinary Medicine* for October,

1914, and on p. 753 I saw and read a short notice on "Directions for the Alum Treatment for Laminitis." There it states: "Begin the alum by giving 2 oz. in a quart of water (it is really better for the horse to dilute it more than this) and repeat every two hours until a pound has been given. All medicinal treatment can ordinarily be discontinued at the end of the first twenty-four hours." Aconitine is also recommended. I decided that my patient should have treatment on these lines, but at once recognized that the dose of alum was about four times as much as the maximum dose given in the therapeutic text-books, and also that the horse would have to be drenched and that a quart of alum water every two hours was going to take a bit of getting down the horse, especially as, unfortunately, he was about the worst animal in the stud to drench. My patient, too, was not a big powerful cart-horse, but a rather small vanner. Having never heard of the treatment before and having no experience of it, I decided to go steady at first, and therefore had four draughts made up, containing in each draught sulphate of alum 1 oz., pot. nit. $\frac{1}{2}$ oz., and B.P. tincture of aconite 15 minims. These draughts were given in a full pint of water within a space of twelve hours, and next day nobody could tell that the horse had ever had laminitis. He was shod with flat shoes, thick at the heels, and leathers, and he now does his work quite well. The treatment seems purely empirical and its physiological action is hard to explain. Dr. Douglas, of New Orleans, and Dr. Merrilatt have both used it often enough in America to prove that its action in my case was not merely a coincidence.

The moral of the case for the veterinarian is: "Read all you can that bears on your professional work, how you can, when you can, and where you can," and occasionally remember Goldsmith's saying that "No nation gives greater encouragement to learning than we do; yet at the same time none is so injudicious in the application."

THE USE OF ARECOLIN IN THE HORSE.

By J. H. PARKER, M.R.C.V.S.

Faringdon.

I WAS called on the night of January 6 last to attend a pony. I found it suffering from tympanitic colic, much swollen in the abdomen, sweating, and in considerable pain. Temperature 103° F. I gave a hypodermic injection of 1 gr. of arecolin, but the only

action it had was to produce salivation. Telling the owner his pony was sure to die if we could not get the bowels to move, with his consent I gave another grain; in five minutes there was copious salivation, and the pony passed a lot of flatus and some fæces, and he was soon quite free from pain. I think the second dose saved his life. He was about 14.2 hands high.

ROARING DUE TO A TUMOUR PRESSING UPON THE TRACHEA.

By C. B. PERKINS.

Centerburg, Ohio.

Subject.—Colt born in May.

History.—Had a slight cough for some time after it was born and later developed a very decided case of roaring. When exercised would become almost exhausted and in some instances would fall down. Seemed to be growing worse.

Symptoms.—Temperature normal; pulse fast when exercised; respiration about 30. Had a very loud snoring or roaring which was unilateral.

Diagnosis.—I told the owner I did not know what the trouble was, but thought that there were nasal polypi, and asked for a consultant.

Dr. Clemmons, of Granville, Ohio, and Dr. W. G. Cliffe, of Upper Sandusky, who was the guest of Dr. Clemmons, were called in consultation. Dr. Clemmons held to the idea of laryngeal paraplegia, Dr. Cliffe to pressure on the trachea, and I to polypi.

Treatment.—Dr. Clemmons began the roaring operation, and when the larynx was opened it was found to be perfectly normal, and the roaring was as bad as ever or even worse.

Autopsy.—Three weeks later the colt died. On *post-mortem* examination I found a tumour on the dorsal surface of the trachea and ventral surface of the longus colli just anterior to the first rib and a little to the right of the median line.

The trachea showed a marked inflammation of the mucous lining for a distance of 12 in. anteriorly and to the bifurcation of the bronchi posteriorly, and the rings for about 6 in. either way were collapsed; the lumen of the trachea being about $\frac{1}{2}$ in. in diameter. Death evidently resulted from suffocation.

Canine Clinicals.

ŒSOPHAGEAL OBSTRUCTION IN A DOG.

By J. H. PARKER, M.R.C.V.S.

Faringdon.

Subject.—A two-year-old fox terrier sent to be destroyed. It had not been able to take any food since eating a rabbit's head a week previously. When I saw it it was retching, and showed undoubted symptoms of œsophageal obstruction. I suggested passing a probang, but the owner preferred to have it destroyed, which we did by injecting about a drachm of chloroform up the nostril. A *post-mortem* showed part of a rabbit's head, superior and premaxilla, with sharp spicules embedded in the walls of the œsophagus just inside the thorax.

IMPACTION OF THE PYLORUS AND BOWELS IN THE DOG.

By G. MAYALL, M.R.C.V.S.

Bolton.

(1) On October 2 a well-bred Clumber spaniel was brought to me suffering from diarrhoea. The owner, who had only possessed him a short time, said that he was an extremely timid and nervous dog, and truly he appeared to be so, for he quivered when spoken to, and cowered about in his apartment like a dog that had been well thrashed most of his life. I gave him a pill containing 2 gr. of calomel, and next morning there was a watery stool of good colour. Astringent medicine in the shape of ext. hæmatox., 1½ gr.; pulv. creta aromat, 4½ gr., was now given twice daily, and at the end of three days the dog was eating fairly well, and fæces almost natural in consistence. After improving in condition for about a week the diarrhoea started again, the dog went completely off his food, and champing of the jaws was very noticeable. This last condition continued for a week, the dog eating very little, but drinking soup and milk occasionally. The bowels became set again, but did not act at all freely. Briefly, the dog got into such a thin and wretched state that he was destroyed with the owner's consent on October 17. On *post-mortem* the only noticeable thing found was impaction of the pyloric orifice, with a piece of straw bent into five folds. The

stomach walls were thin, and the mucosa pale and anæmic. The champing of the jaws, which was very noticeable and at times continuous, was evidently a reflex act due to the irritation of the impacted mass of straw.

(2) We are often called to cattle here in the autumn of the year which suffer from impaction of the fore stomachs with dry fibrous grass, but until this year I have never suspected that dogs might suffer from a somewhat similar cause. On November 4 a gentleman brought a fox terrier to me that I had previously treated on two occasions for worms. He seemed rather annoyed that these should occur again, but I told him that the dog which often picked up refuse might easily reinfect himself. I gave the subject a full dose of oil of male shield fern, and kept him at the infirmary for a week. On the second day, as his bowels had not acted, I gave him a dose of calomel. On the third day, there still being no fæces, I gave him an enema of glycerine and warm water, and within a quarter of an hour he passed half a teacupful of felted, impacted fibrous grass.

(3) A fox terrier previously treated for worms came in on December 10 with the announcement that he had worms again. I gave him the same treatment as in Case 2, and on the third day he passed an eggcupful of firmly impacted decayed grass.

Both these dogs recovered and have been well since. Both of them were in the habit of going into their owners' back gardens and eating plentifully of the grass. Both the owners were shown the stuff the dogs parted with, and both were satisfied.

There is a popular idea that eating green grass does dogs good. In these cases the grass was fibrous, dead, and in-nutritious, and caused impaction of the bowels in the dogs. The owners had evidently mistaken occasional blades of grass that had been parted with for tapeworms.

VAGINAL TUMOUR IN A BITCH.

By G. MAYALL, M.R.C.V.S.

IN December a fox terrier bitch, brought to me bleeding and discharging at the vulva, was found on examination to be suffering from a vaginal tumour. The growth was painted, injected with "anæsthene" (Wyley's, Ltd.), and ligatured tightly with silk, care being taken not to include the urethral orifice, and cut off with the scissors at the back of the ligature. The ligature came away the third day, and the vagina was injected daily alternately with alum solution and witch-hazel. After a fortnight's

injections there was still some hæmorrhage and glairy discharge from the vulva, and I could feel a pit in the wall of the vagina, to which I traced the hæmorrhage. Having read of a new styptic (adrenalin not having been very satisfactory with me) called "Coagulén" formerly, and now "Euclottin," I wrote to the Saccharin Corporation, Ltd., 36 and 37 Queen Street, London, E.C., for a small bottle, and having obtained same and mixed it as directed with water, I packed the vagina on two occasions with cotton-wool soaked in the solution. All blood and discharge ceased after two applications, and the bitch went away quite cured at the end of the third week. The tumour removed seemed to be a fibro-lipoma, weighed 2 dr., and was as large as a walnut.

Euclottin is a powerful styptic, non-irritant and non-toxic. It hastens coagulation and clot formation in hæmorrhage and hæmophilia. It has been largely and successfully used by Professor Kocher and Dr. Fonio, of Berne. It is prepared from blood residues, and is free from inorganic salts.

"Clinical experiences with hæmostatics are now being supplied to the medical profession with some freedom," and in the *Lancet* for April 4 and 11, 1914, there are two notes on the subject.

VETERINARY MATTERS IN BRITISH GUIANA.

THE destruction of a mare suffering from advanced glanders was reported. The animal had been discovered on the public road, but through the neglect of the Board's officer the owner had been only reprimanded when a much severer penalty should have been imposed.

A disease which had recently broken out amongst mules on a number of the Berbice sugar estates was then discussed. Professor Harrison told the members that it was at first thought to be cerebro-spinal meningitis, but as considerable dissatisfaction was displayed in certain quarters at this diagnosis they were obliged to obtain the services of the Assistant Government Bacteriologist to investigate the disease.

This officer succeeded in obtaining almost identical results as Captain Farrant, the well-known Berbice veterinary authority, and eventually both were unanimous in diagnosing it as *mal de Caderas*, a South American equine disease.

The disease had been added to the list of contagious diseases, and certain areas had been declared to be infected.

A letter had been drafted dealing with the disease, which would be sent to all concerned, and posters would be exhibited in conspicuous places.

A vote of thanks to Captain Farrant and the Assistant Government Bacteriologist for their services was then carried, and also to the Surgeon-General for allowing the Board the bacteriologist's services.

The annual inspection of the Experimental Fields was fixed for Monday, October 13, at 2 p.m.—*Journal of the Board of Agriculture, British Guiana.*

The Veterinary Profession and the War.

A MOBILE VETERINARY SECTION (EXPEDITIONARY FORCE).

THE formation of a Mobile Veterinary Section is as follows:—

One captain, four sergeants, one corporal, one shoeing smith, four privates, two batmen, one driver (A.S.C. first line transport), a number of "horse leaders" as required for dealing with droves of horses.

The functions of an M.V.S. are to follow the fighting line as



Mobile Veterinary Section, 3rd Brigade, 2nd Mounted Division,
2nd London Division.

near as possible and to clear the evacuation zone of wounded, riderless, and stray horses and administer first aid treatment. Then they check horse wastage as far as possible on the spot. These collected horses are taken to the nearest railway or placed in charge of civilian drivers, and conveyed to the nearest temporary veterinary hospital on the lines of communication for treatment and classification. All men of the M.V.S. must, of course, be good horsemen, and are provided with a complete veterinary wallet containing first aid drugs and instruments, and carry rifles for their protection.

MOBILE VETERINARY SECTIONS.

(1) MOBILE veterinary sections are line of communication units. The personnel is laid down in war establishments. Their function is to relieve field units of all sick and inefficient animals and convey them through the evacuation zone to a convenient railhead for despatch to the veterinary hospitals on the line of communication.

(2) One is mobilized for each division and cavalry brigade of the field army. They are the connecting link between the field troops and the veterinary hospitals, and the efficient evacuation of horse casualties from the field army depends upon them.

(3) In the collecting zone sick and inefficient animals are transferred to mobile sections at collecting stations, the location of which are usually at the discretion of divisional or other commanders; but orders as to their location may be issued by general or Army headquarters, which control the movements of mobile sections whilst in areas beyond the jurisdiction of the I.G.C.

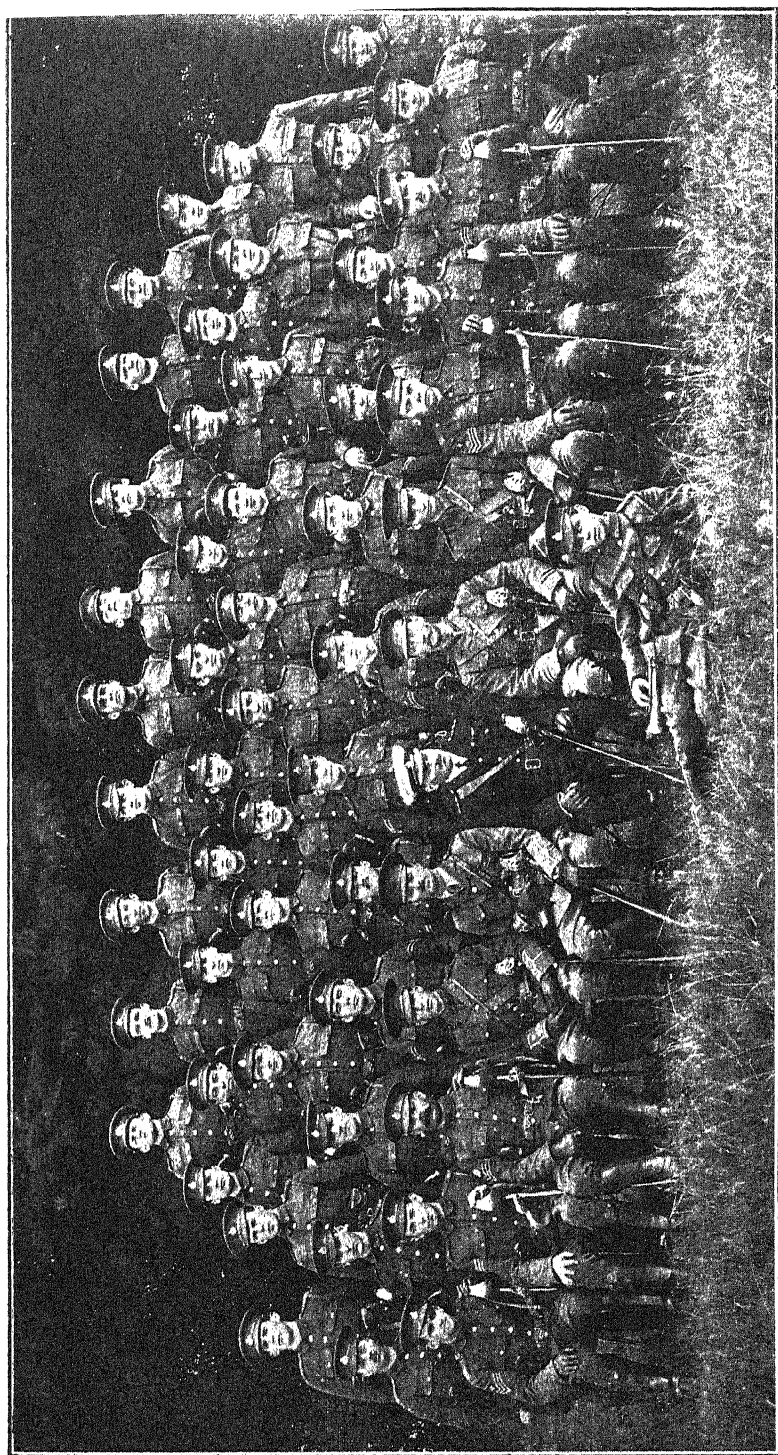
(4) After taking over sick animals, a mobile section proceeds to railhead with as little delay as is consistent with the well-being of the animals in its charge.

(5) Local labour is obtained to render any necessary assistance as horse leaders in conducting animals to railhead, unless the services of dismounted men proceeding thereto can be utilized. On arrival at railhead horses are entrained and despatched to the nearest veterinary hospital.

(6) When an unusual number of animal casualties is anticipated, the I.G.C. is at once notified to enable arrangements to be made for their reception.

EXTRACT FROM THE LETTER OF A VETERINARY OFFICER IN A HOSPITAL IN FRANCE.

THIS camping ground is a great improvement from what we had at the two other places. It is a large brickfield about seven or eight acres, which had to be shut down some weeks ago on account of scarcity of labour and dearness of coal. The sheds for the horses are what are used in one of the processes of drying the bricks and make excellent shelter. Down the centre of these



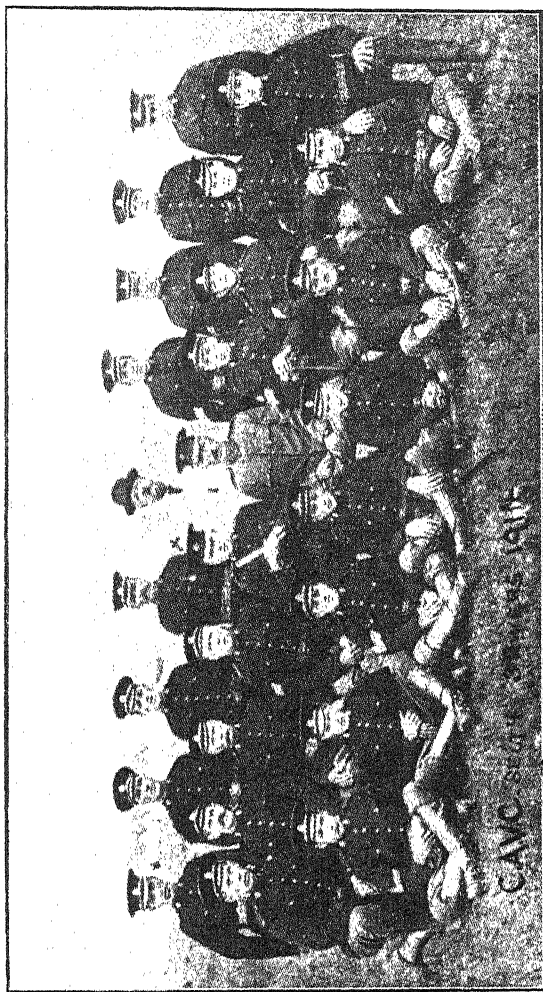
The Royal (Dick) Veterinary College Contingent, Officers' Training Corps, Rushmoor Camp, Aldershot, July, 1914.

(measuring over 100 yards long) mangers were made, and horses stand on either side, holding in each shed over 140 horses. The roofing is tile and a sandy floor. In all we can accommodate 1,000 horses in such sheds. At a farm close by there is a lot of good stabling and loose boxes. These have also been taken and will accommodate about 100. A small paddock adjoining this farm is also included. To this place our worst cases are sent.

These brick works have proved most accommodating for our requirements without having to do much building. At end of sheds for horses is a large fine shed with a dug-out pit about 2 ft. deep with tiled bottom, and measuring 24 ft. by 12 ft., used in making clay for bricks. This pit is used as a place for our casting-bed for horses for operation and does splendidly. We have a large tarpaulin filled with a thick bed of straw, which fits the pit and can be taken out when not required, and the pit made use of for standing horses in to dress. Besides casting-bed the shed can accommodate another five or six horses comfortably to dress. The shed was well cleaned out, lime-washed, a good-sized table fitted in, thus making shed look quite smart and nice. I am *chief* of this part of our hospital. My skin cases were taken over by No. 5 Section when we left the other place, and in coming here our C.O. put me as officer in charge of operation shed. I was pleased to get that work; there are heaps to do, but I do not mind that. Your continual drumming into me to get a good-sized dependent opening and give good drainage and not be afraid to use the knife stands me in good stead now. We are well equipped for surgical work. Get a good few quittor cases, and I am not losing the opportunity to try and improve myself. Also get a big number of awful bad withers. Then, of course, there is the steady stream of wounded from bullet and shrapnel (chiefly shrapnel), although during past few weeks there has not been so many of these coming down.

Well, to go on with remainder of building given over to our use, there is a fine laboratory, which the proprietor also kindly cleared out and gave over to be used as surgery.

His forge, which is quite a decent size, he also handed over, and which suits requirements of section A1, also several other sheds. The men have been made very comfortable, too; two large barns (used in process of drying tiles) were cleared out of all tiles and make excellent sleeping places. Then another big



Canadian Veterinarians enlisted for the European War.
Reproduced from the "American Journal of Veterinary Medicine."

shed serves as a dining place for them. We have now nearly 340 men.

Our own riding horses—eight in number—are stabled in his own private stables.

I am afraid I shall be tiring you with so much about self, but I thought it might interest you to know what sort of place we were camped in. The proprietor has been exceedingly good in doing all he could to help us, and specially to make men and horses comfortable.

Eight days after we left other camp two German airmen flew over and dropped several bombs, two actually dropping on place where our camp had been, but no damage was done, as none of them exploded. Several flew over while we were there, but this was the first time any bombs were dropped.

By the way, do you remember I told you last time I wrote that someone from Board of Agriculture was coming round? It was Dr. McCall, of Ricky, who came, and I had a chat with him for a short time.

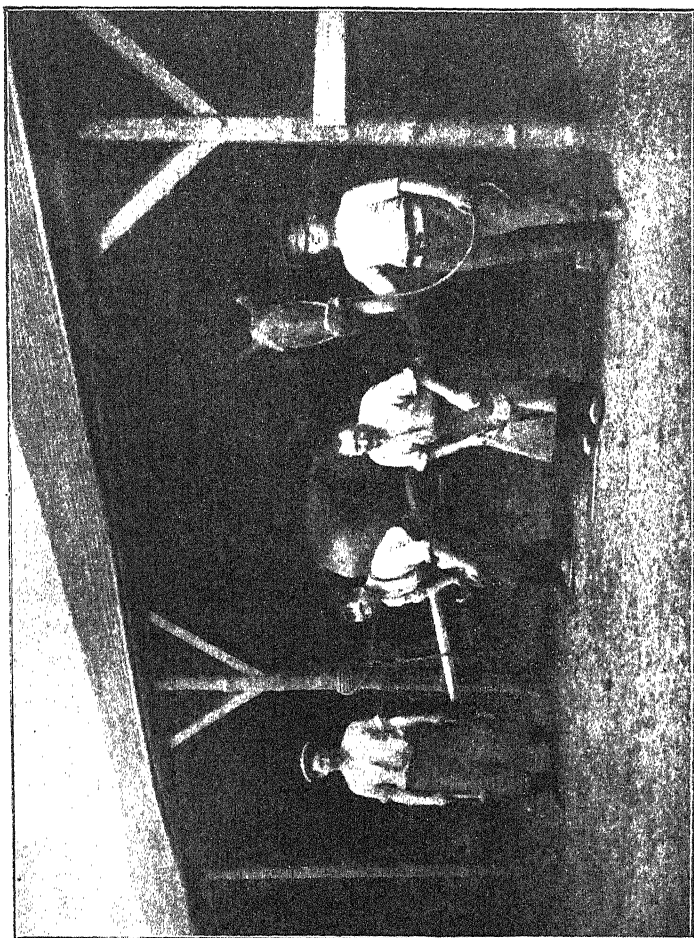
And how is the work going with yourself? Having many very tiring days, I expect. It is nice having this Mr. Craig near you. He will be able to relieve you for a few hours occasionally when you want off. What a clearance of troops there will be throughout the British Isles between now and end of March. It is to be hoped that after that their pressure will be felt on German lines.

Many thanks for offering to send papers, but we are well off for getting English papers here. If at any time there is anything of special interest in THE VETERINARY JOURNAL I'll be most grateful to you if you will send it on. I expect articles to it are very scanty now.

Well, I must conclude and go round my tour of duty.

THE AMBULANCE DOG (*LE CHIEN SANITAIRE*).

An able article penned by M^{éd.}-Major Bichelonne and Captain Tolet appears on the above in the *Archives de Médecine et Pharmacie militaires* for June, 1914. The article deals with the history of the movement, the rôle that these dogs will play in war, how they should be trained, and the class of animal to be selected for this special education.



Army Farriers at Work.

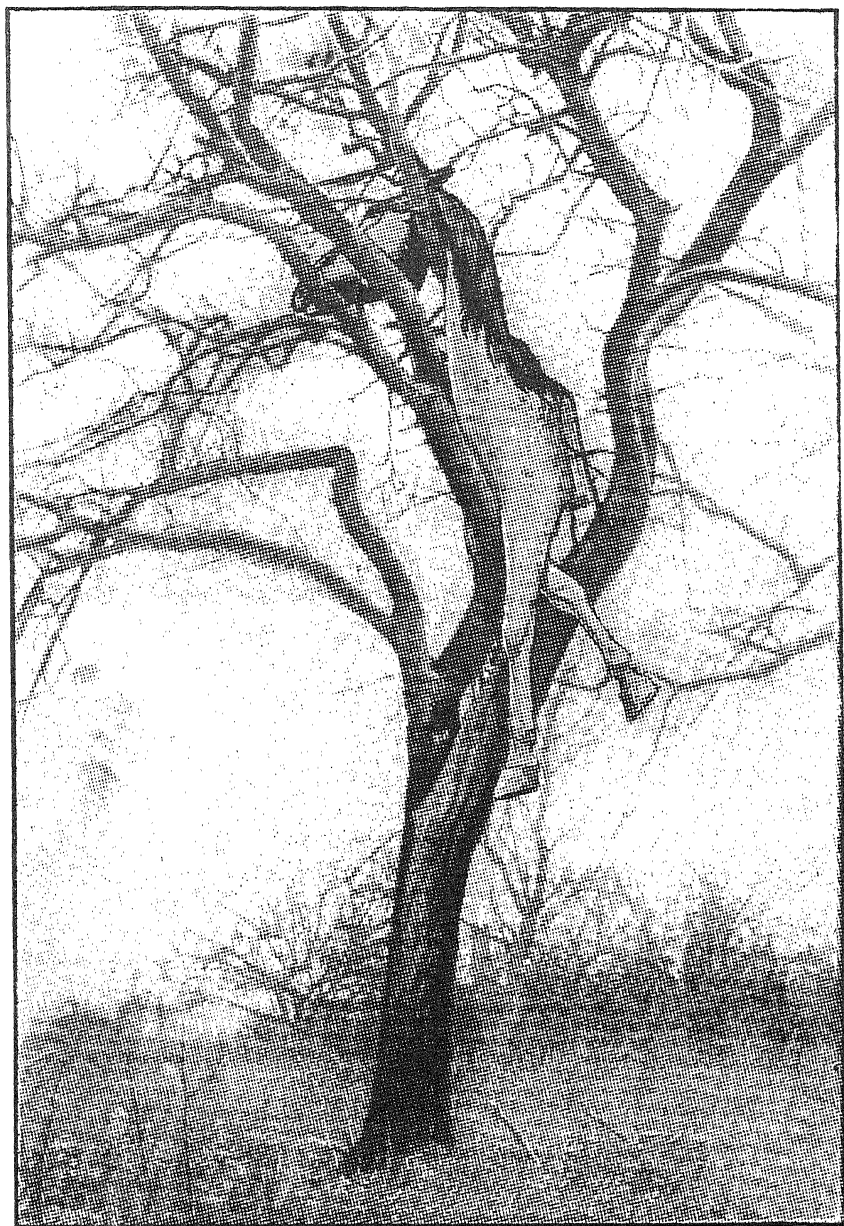
The writers enlarge on the difficulties that the stretcher-bearer will have to contend with in modern wars; his work will to a large extent be carried out at night and it will often be very difficult to work with lights. They quote Motais, who maintains that in recent wars one-third of the men reported as missing must be counted among the dead.

The ambulance dog has had most success in the German Army, where there are said to be about 2,000 trained dogs registered for mobilization purposes. The ambulance dog has received official recognition in France and four to six of these trained animals will be allotted to each bearer company on mobilization. There are at present about fifty trained dogs and another fifty in training. A non-commissioned officer of the medical corps from each army corps is sent to Fontainebleau every year to the military dog-training school to learn how to look after these animals and how to train them. The course lasts three weeks.

A national society called the *Société Nationale du chien sanitaire* has been formed to provide for the training of dogs, and it already has several branches in France. Some of the voluntary aid societies are also interested in the matter.

With regard to training the article discusses three methods: The dog is trained (1) to bark when a wounded man has been found, or (2) to return to the stretcher-bearer after finding a wounded man and then bark, or (3) to bring back something belonging to the wounded man. The last method appears to be the best.

The employment of the ambulance dog on the battlefield would be on the following plan: The stretcher-bearers first skirmish over the ground and collect all the wounded that they can see. They then return with the dogs and go over all the likely places to which wounded men may have crawled to get into cover. This is the scheme for working during the day. The search must be done systematically, and each group with their dog must work over a definite area. The dog works from side to side, follows the scent, and when it finds a wounded man it brings back his cap or handkerchief to the stretcher-bearer. The leash is placed on the dog and the stretcher-bearer is led to the patient. The dog will probably work better at night, but the stretcher-bearer's task will be no light one.



French troops have often noticed the remarkable effect of the fire of their famous "75" guns. Sometimes, after territory has been won back from the Germans, it has been possible to confirm observations made from French lines. Our photograph shows a curious instance where half the body of a horse was found in a tree, having been projected there from a distance of 230 yards by a shell from a French "75" gun.

Reproduced by the courtesy of "Reynolds's Newspaper."

The training of the dog should be undertaken when it is 5 or 6 months old; it is taken out on a leash and taught obedience. The dog is also allowed to run loose, and should be frequently called to heel. When a dog is called never go to him, always make him come to you. Training to "fetch" requires a lot of patience. The animal is first taught to "take" and "give"; the length of time it has to hold things in its mouth is gradually increased. It is then taught to "fetch," and it must not be allowed to drop things. When out walking the animal should be made to carry various things in its mouth. It should also be taught to jump over obstacles and to take to water.

The second part of the training should not be undertaken until the dog is well disciplined and "fetches" to order. He then receives instruction on the dummy, and then with men lying concealed on the ground. He is taught to search the pockets for loose objects such as a handkerchief in case the wounded man has lost his cap. It requires a lot of patience to teach the dog to return to the wounded man after bringing back the cap or handkerchief; endeavours have to be made to let the dog see what is required of him, and one way of doing this is to make him carry the cap on the way back to the patient for the first few lessons and also not to put him on the chain. When this lesson has been mastered some night practices are undertaken.

The dog is then taught to look for a certain number of men placed in a certain order and it must find them again in the same order. The work is gradually extended over a distance of several kilometres. The dog must also be accustomed to march with infantry and to work with stretcher-squads, and it must be accustomed to infantry and artillery fire. As a rule this presents no great difficulties. A dog may be considered well trained when, having found his master lying out as a wounded man, he returns without hesitation to bring back assistance.

The article concludes with some interesting notes on the various breeds of dogs which have been trained for this purpose in different countries.—J. V. F., *Journal of the Royal Army Medical Corps*, October, 1914.

POINTS OF A CAVALRY HORSE.

SPECIFICATIONS for horses and mules issued by the office of the Quartermaster-General, United States Army, contain the information desired. The general description for horses would take the place of the score card. Under special description for mature cavalry horses we find the following:—

“The mature horse must be sound, well bred, of a superior class, and have quality; gentle and of a kind disposition; well broken to the saddle, with light and elastic mouth, easy gaits, and free and prompt action at the walk, trot, and gallop; free from vicious habits, without material blemish or defect. A gelding of specified colour (no white or gray horses will be accepted), in good condition; from 5 to 8 years old at time of purchase; weighing from 950 to 1,100 lb., depending on height, which should be from 15 to 15 $\frac{3}{4}$ hands, and otherwise to conform to general description for horses.”

Under description for young horses for cavalry we find the following:—

“The young horse must be sound, well bred, of a superior class, and have quality; gentle, free from vicious habits, and of a kind disposition, broken to halter, with free and prompt action at the walk, trot, and gallop; without material blemish or defect, and otherwise conform to general description for horses, and also to the following special requirements: A mare or gelding of specified colour in good health and fair condition. Mares will be purchased only when exceptionally fine individuals, and then by special authority. Two-year-olds: Minimum height, 14 $\frac{3}{4}$ hands; minimum weight, in flesh, 750 lb. No two-year-olds will be purchased except when specially authorized. Three-year-olds: Minimum height, 15 hands; minimum weight, in flesh, 850 lb. Four-year-olds: Minimum height, 15 hands; minimum weight, 900 lb. Weight depending upon height.”—*Breeders' Gazette*.

Municipal Veterinary Medicine.

COUNTY BOROUGH OF BLACKBURN.

ABSTRACT OF THE ANNUAL REPORT OF MEDICAL OFFICER OF
HEALTH, 1913.

THE MILK SUPPLY.

No article of food takes so important a place in our dietary, especially during the early years of life, as milk; and yet none under present conditions is a more possible source of disease. The germs of tuberculosis, infantile diarrhoea, scarlet and typhoid fevers may all be carried in milk, which at the same time forms an excellent medium wherein they can grow and multiply.

No article of food, therefore, requires greater care in its collection, distribution, and storage; but, unfortunately, it is very difficult to alter the practice of past generations and induce those concerned in the milk business to appreciate the need for those special precautions which modern science has shown to be necessary.

The Dairies, Cowsheds and Milkshops Orders, 1885-1899, give local authorities a certain amount of control over the sanitary condition of the cowsheds within their own respective districts, and a few progressive authorities, including Blackburn, have obtained special powers in local Acts of Parliament to deal with tuberculous milk supplied within their districts, whether coming from farms within or without their districts.

The Tuberculosis Order, 1913, which came into force on May 1 of that year, requires the notification of any cow having a tuberculous udder or an udder which is indurated or otherwise diseased, and of any bovine animal which is or appears to be suffering from tuberculosis with emaciation. The Order also enjoins the inspection of the cattle on the farm in question by a veterinary officer and the slaughter of any diseased animal, compensation being paid to the owner according to the agreed value of the animal and the stage of the disease.

By the frequent systematic inspection of the dairy cattle by the veterinary inspector the milk supplied from farms within this borough is kept for the most part free from the germs of tuberculosis; but a higher standard of cleanliness as regards the

shippons, cows, and milkers, and greater attention on the part of farmers to abnormal udder conditions, are often greatly to be desired. A further advance would also be made towards a pure milk supply if milk were cooled immediately after its collection and adequately protected from contamination during its distribution.

There is no doubt that the present method of ladling out the milk from open cans in the dusty street is open to criticism.

Reference must also be made to the retail milkshop and to storage at the home.

At the retail milkshop there is very often opportunity for the further contamination of the milk, but in Blackburn the milk is taken, as a rule, in the farmer's cart direct to the consumer's house, and only a small proportion passes through the retail milkshop.

Finally, there is the storage at the home, and the education of the people in the need for greater cleanliness as regards food generally, and especially milk, together with the provision of improved accommodation for the storage of food, can alone solve this part of the problem.

Were it not for the increased cost of the method, the distribution of milk, after cooling, in small stoppered bottles, containing the varying quantities required by the various householders, would probably be the most hygienic course.

A considerable part, however, of a town's milk supply, and in many instances by far the greater part, comes from dairy farms situated outside the town's jurisdiction, and, as the extent to which the Orders above referred to are put into operation in any district depends in a large degree on local inclination, there is no guarantee in any instance that the milk which is brought into the town comes from herds which have been thoroughly inspected.

It is generally held that fresh untreated milk, provided it is free from harmful germs, has definite advantages over sterilized milk, especially as a food for infants and young children, and it is therefore most essential that milk is so safeguarded from dirt and disease germs that it can be given to children with safety unsterilized. Under present conditions, however, it is far the safer course to boil all milk that is given to children.

The approximate number of cows housed within the borough is 1,300.

The approximate number of cows supplying milk to the borough from farms situated in outside districts is 3,750.

Samples have been taken regularly from the milk brought into the borough from the surrounding districts, and have been submitted to bacteriological examination for tubercle bacilli, and of the 57 milk supplies examined, 3 were found to contain tubercle bacilli.

The farms supplying infected milk were visited by the veterinary inspector and the herds examined. Further samples of milk were taken from any cows giving evidence of tuberculosis and, if the bacteriological examination of any sample confirmed the presence of the disease, the farmer was ordered to isolate the cow from the herd and to cease sending the milk from that cow into the borough.

At the same time the case was reported to the County authority under the Tuberculosis Order, 1913.

The farms situated within the borough have been regularly visited by the veterinary inspector and the herds examined, special samples being taken from any cows showing any evidence of udder disease or of general tuberculosis.

The cowsheds and dairies were also inspected as to their general sanitary condition.

During the year 201 visits were paid to farms by the veterinary inspector, and 3,981 examinations of cows were made.

Eleven cows were found suffering from tuberculosis of the udder, 7 being on six farms outside the borough, and 4 on four farms within the borough.

Of the 4 cases occurring in the borough, 1 was notified by the owner, 1 by the veterinary surgeon in attendance, and the other 2 were found during the routine inspection of the veterinary inspector.

Of the cows examined on the dairy farms within the borough, 15 showed definite abnormal conditions of the udder, 4 being due to tuberculosis and 11 to non-tubercular mastitis.

Under the Tuberculosis Order, 1913, 3 cases of suspected tuberculosis of the udder were notified, 1 by the owner and 2 by a veterinary surgeon. One of the latter 2 cases was found not to be due to tuberculosis.

Six cases of "tuberculosis with emaciation" were dealt with. Two were reported by owners, 2 by the veterinary surgeon in

attendance, and 1 was found by the veterinary inspector during his routine inspection.

The remaining case was reported by the medical officer of health of a neighbouring authority as having been removed from his district and being about to pass through Blackburn.

The man in possession was prosecuted and fined 20s. and costs.

MEAT INSPECTION.

Mr. Burndred took up his duties as veterinary inspector at the end of April, Mr. Hayhurst, his predecessor in office, having been appointed Superintendent of the Islington Cattle Market.

Meat inspection is carried out by the veterinary inspector, who is the Chief Meat Inspector, and by the Assistant Meat Inspector.

The total number of carcasses destroyed shows a decrease of 37 carcasses when compared with the number destroyed during 1912.

The following are the figures relating to condemned carcasses during the last five years:—

	1909	1910	1911	1912	1913
Beef ...	88 ...	70 ...	72 ...	66 ...	75
Mutton ...	110 ...	114 ...	100½ ...	77 ...	61
Veal ...	65 ...	27 ...	64 ...	64 ...	51
Pork ...	51 ...	43 ...	32 ...	38 ...	21
Goats ...	1 ...	2 ...	1 ...	— ...	—

A total number of 13,229 beasts, calves, and pigs were slaughtered during 1913, of which 307 were tuberculous, or a percentage of 2·32.

There has thus been for the most part a progressive diminution in the amount of tuberculosis amongst the animals slaughtered at the Blackburn Abattoir, but this does not necessarily indicate a general diminution of the disease in this country.

Tuberculosis was not present in any sheep out of a total number of 49,979 sheep slaughtered.

Of the above-named 307 tuberculous carcasses, 55, or 17·9 per cent., were totally rejected; 208, or 67·7 per cent., were cows, and 42 of these, or 20·2 per cent., were rejected.

Three hundred and two of the 307 tuberculous animals were affected with tuberculosis of the lungs.

Twenty of the 29 tuberculous udders were found in 2,723 cows slaughtered in the abattoir, or 0·73 per cent.

The remaining 9 were from cows condemned for tuberculosis of the udder.

Eleven of these 29 cows were giving milk on the day of slaughter.

Milk from 10 of these cows was sold in Blackburn, but in only 4 cases did the cows come from farms situated within the borough.

Regarding the extent of the tuberculous process in these 29 cows, 13 exhibited the disease so extensively that they were totally rejected for human food.

During 1913, 2 private slaughter-houses were closed.

There are now 10 private slaughter-houses in Blackburn.

During 1913, 1,868 diseased carcasses were examined at the public abattoir and private slaughter-houses in the borough, 208 of which were rejected and destroyed as unfit for human food. Compared with last year, this return shows a decrease of 6 diseased carcasses.

During the year 11,690½ lb. of unsound meat, 544 rabbits, and a large quantity of fish were also destroyed. Compared with last year, this return shows an increase of 5,884½ lb. of meat and a decrease of 21 rabbits.

The total weight of the rejected carcasses, organs, meat, &c. (excluding fish) destroyed during the year was 44 tons 16 cwt.

The number of diseased animals is greatly augmented by the presence of distoma in the liver of cattle and sheep, which necessitates the rejection of that organ.

REPORT OF THE VETERINARY INSPECTOR UNDER DISEASES OF ANIMALS ACTS AND ORDERS FOR THE YEAR 1913.

The borough is in an enviable position as regards the scheduled diseases, the only diseases occurring being parasitic mange (1 case) and tuberculosis.

Anthrax.

Two cases of anthrax were brought from outlying districts to a knacker-yard in the borough.

During the year I made microscopical examinations of blood, &c., from the carcasses of 5 beasts, 22 sheep, and 1 pig, and found anthrax bacilli in two cases. In both cases the Chief Veterinary Officer of the Board of Agriculture confirmed the diagnosis.

The Board of Agriculture returns for 1913 show that during

the year 594 outbreaks of anthrax, confirmed by the veterinary officers of the Board, occurred in Great Britain, in which 652 animals were affected.

Glanders and Farcy.

One case of this disease was reported, but was not confirmed.

Sheep Scab.

The approximate number of fat sheep brought into Blackburn during the year was 49,979, and the number of store sheep exhibited for sale in the cattle market was 358. No case of sheep scab was reported or detected amongst them. Five sheep were dipped.

Foot-and-mouth Disease.

No cases occurred in the borough during the year.

Parasitic Mange.

One case of this disease occurred in a horse which had been brought into the district a fortnight previously. It was isolated until cured.

Tuberculosis.

Four cases of tuberculosis of the udder, and 6 cases of tuberculosis with emaciation were dealt with under the Tuberculosis Order, 1913.

Cattle Market.

The Cattle Market has been regularly cleansed and disinfected in accordance with the provisions of the Markets and Sales Order of 1910, after each of the two markets held weekly.

Visits and Inspections.

To the Cattle and Pig Markets	...	...	207
To the Railway Cattle Siding	...	...	99
To the Irish Pig Pens	...	...	49

Total	355
-------	-----	-----	-----

ERNEST J. BURNDRED, M.R.C.V.S., D.V.H.,

Veterinary Inspector.

LIVE STOCK AND FEEDING STUFFS.

FACTORS CONTROLLING FERTILITY IN ANIMALS.

AN investigation was held to throw further light on certain of the factors which limit the fertility of domestic animals. The animals examined were rabbits, pigs, and a bitch.

It was found that various circumstances, the chief being the age of the animal, control the number of ova shed at each heat period. The data obtained showed that the low fertility of young as compared with adult sows is due to the fact that not so many ova are shed at each period.

Counts were made of the number of corpora lutea present in the ovaries and the number of foetuses present in the uteri of pregnant rabbits and pigs, and the results showed that many more ova are shed at the heat period than young are produced at birth. Some ova possibly may be lost, but many ova, after being fertilized, atrophy or wither at some period of their development, and undergo absorption in the uterus.

While the occurrence of atrophic foetuses only causes reduced fertility in animals which have many young at birth, their occurrence in the case of animals producing only one young would give rise to sterility, so that the problem of the cause of the atrophy becomes an important one.

It appears that the atrophy is not bacterial in origin, since frequently healthy and atrophic foetuses lie side by side in the uterus. Moreover, no bacteria could be found either in the foetus or foetal membranes.

A number of foetal rabbits and pigs were weighed, and the results showed that competitive nutrition in the uterus has little effect in determining the size of the foetus, while evidence was given to show that nutrition cannot be the cause of atrophy. It seems possible that the atrophy is due to innate lack of vitality in the foetus.

No conclusion has yet been arrived at as to the cause of the atrophy, and the various possibilities are still under investigation.
—J. HAMMOND, M.A., *Journ. Agric. Sci.*, vol. vi, Part 3.

Translations.

FRACTURES OF THE EXTREMITIES OF CATTLE.

By G. GIOVANOLI.

Veterinary Surgeon, of Soglio.

NEW-BORN animals brought into the world by extreme force frequently suffer from fractures. Later separations in the bony column are chiefly occasioned by sudden immoderate strain or a violent shock to the tissue. Great external force acting on the body will generally cause fracture of bone if the osseous tissue cannot offer sufficient resistance to the onslaught.

Fractures occur in all domestic animals, rather more frequently in animals on the Alps and whilst grazing. A marked influence on the frequency of broken bones is doubtless exercised by management and feeding. Limited movement, such as occurs in long-continued stalling weakens the organs of progression and produces a marked stiffness, especially in young animals. As soon as some of these go out to graze they give vent to their joy at freedom by leaping, jumping, and dashing about, unaware of the danger they run. They are stiff more or less as the result of their long confinement in a stall, and slip and stumble on the least resistance to the earth. In slipping about they can fall over rocks or with a foot between two stones, or be held or jammed by the exposed roots of trees. Powerful efforts to free the foot from restraint easily cause fractures.

The experience of practice shows that the power of resistance of bone to fracture is very different in individual animals. Not all bones break in like circumstances. A slight mishap is frequently sufficient to cause fracture in many animals. Often a powerful force will not cause a broken limb. As a rule short, thick bones surrounded by thick layers of muscular tissue are not so easily broken as long bones covered by no soft structures. In the limbs fractures are easily recognized by abnormal movement and by unnatural movement of parts where there are no joints. With bones covered with much muscle the recognition of breaks is often very difficult, and at times almost impossible. Crepitation, the sure sign of fracture, is made inaudible by the considerable covering.

Before undertaking attempted cure one should determine

whether treatment will restore to the owner the agricultural use of the animal. Useful treatment and cure does not mean merely that the separated parts shall heal, but that repair will occur in such a way that the injured part will recover its form, mobility, and dexterity.

In cattle, then, treatment is only justified if the lower bony columns of the limbs are broken, and if the fracture has not been produced by great violence with great injury of the soft parts and crushing of the neighbourhood. Fractures in the region of joints are always unfavourable and easily lead to arthritis. If one resolves to undertake the treatment of fractures of thin round bones in animals, one must not forget that first aid has a great bearing on later cure.

Injuries to bones occur as a rule at some distance from the shed or stall where the animal has the opportunity of suffering a mishap. The question then arises: Must we adopt treatment on the spot or not? As a rule treatment is best undertaken in the stall or shed. The getting up and transport of the animal is a matter of the greatest difficulty. It should be done with care, and with the parts fixed as far as possible with a suitable bandage. Without previous immobilization of broken limbs one should never undertake the transport of animals.

Quick repair of a fracture with complete restoration of the form and direction of a limb depends upon replacing the displaced broken ends of the bone and their retention in their normal anatomical position. Disappearance of unevenness signifies restoration to normal position, and thereafter a bandage should be immediately applied. I start bandaging at the claws and carry the bandage well above the fracture. I use white resin boiled with wine to the consistency of broth to smear on the bandage, and put plenty of the mixture on at each turn of the bandage. The stuff when put on warm is easily spread, and fills up all hollows and prevents shifting of the bandage. When the bandage is put on its firmness is increased by a piece of thin soft wood soaked in boiling water and moulded to the part. The splints, of which there may be four or five, are bound fast with string. Thus a light, solid, waterproof and easily constructible bandage is made, which immediately hardens and protects the break sufficiently. The bandage may remain on until it falls away of its own accord.—*Swiss Journal of Veterinary Medicine.*

SODIUM HYPOSULPHITE IN DISTEMPER.

BY VETERINARY SURGEON TEPAZZ.

THE author calls attention to the fact that in several sporting papers circulating largely in the South of France, the well-known sodium preparation has been used by numerous dog owners in cases of distemper and has been much lauded and credited with producing some wonderful results. Although Tepazz considered the drug as not of much use, since it is well known in veterinary therapy and only a weak anti-pyretic effect is ascribed to it, nevertheless he resolved to give the simple medication a thorough trial, and the opportunity for doing so was in no way wanting. The first experiments being encouraging, he commenced systematic use of the hyposulphite and discarded all other medicine. In this way he treated sixty dogs ill with distemper, and in the great majority of cases quick recovery took place, and therefore he does not want to "hide the light under a bushel."

Treatment has soon shown that sodium hyposulphite is only suitable for distemper cases in the commencing stage, and must then only be given in small doses (3 gr. to 15 gr.). It must be administered daily, and is best dissolved in fluid nourishment, such as milk. Its application is quite simple, and it produces its effect equally well with whatever form of distemper one has to deal. It is valuable because about ten powders generally accomplish the desired end and no other medicine need be considered, and undoubtedly it seems to have a great specific action which requires further investigation. The favourable effect of the drug was always evident even on the second day of its use. The course was generally preceded by giving calomel and scammony, 30 to 50 cg. of each. The first dose of hyposulphite followed one day after the purgative. Where greatly increased respiration was present it was always advisable to supplement internal medication with skin irritants, such as Prieznitz's poultices. The first effect is always abatement of the diarrhoea, the fæces soon exhibit the moulded to the bowel form, and has a pronounced odour of SH_2 . This gas also produces a good effect in the nervous form of the disease. Further favourable action is indicated by cessation of the irritable cough, decline of nasal discharge, and return of appetite.—*Revue générale de Méd. vét.*

Reviews.

A Synopsis of the British Pharmacopœia, 1914, and of the Poison Laws of Great Britain and Ireland. By H. Wippell Gad, F.C.S., of the Middle Temple and Western Circuit, Barrister-at-Law, formerly Lecturer on Pharmacy at the University College, Exeter. Eighth edition. Published by Baillière, Tindall and Cox, 8, Henrietta Street, Covent Garden. 1915.

This is an exceedingly useful little book for those who prescribe and those who dispense. The publication of a new Pharmacopœia is of much importance to the professions of medicine and pharmacy, and the present one is a great advance on its predecessors. The volume under consideration furnishes a handy summary for students, medical men, and pharmacists of the constituents and strength of various drugs. Various tests for chemicals are given, and a section on Poison Laws at the end of the book has been revised by the author in accordance with recent Orders in Council. There is a complete table of all chemicals, drugs, and preparations in the Pharmacopœia, and their characters, metric and imperial doses are given. That the little work has achieved an eighth edition is a credit to the author, and shows that the "Synopsis" is largely used and appreciated. It is serviceably bound, and can easily be carried in the pocket.

G. M.

Journal of the Royal Army Medical Corps. Edited by Colonel W. H. Horrocks, assisted by Major E. T. F. Birrell, both of the R.A.M.C. Issued monthly. Printed and published by John Bale, Sons and Danielsson, Ltd., Oxford House, Oxford Street, W. Price 2s. net.

This is an exceedingly well got-up and printed periodical, full of interesting articles, many of which bear on present-day martial conditions. Lieutenant-Colonel Beveridge, D.S.O., discourses on "Some Essential Factors in the Construction of Field Service and Expeditionary Rations." The selection of articles of diet to meet all needs while campaigning is lucidly dealt with, and the questions of their portability and ease of preparation are well arranged and settled.

The points discussed by Lieutenant-Colonel Beveridge provide for an adequate nourishment for fighting men to last without being replenished for a sufficiently long time, to enable most military operations to be commenced and carried on until further supplies arrive.

The Zululand trypanosome and the susceptibility of animals thereto is written about in an article by Sir David Bruce and several collaborators. Colonel Firth, in "God's Acre in North-west India," records the names of many of the glorious British dead that rest there and gives brief biographies of them.

"The Clinical and Other Notes" are well illustrated and full of interest. One of them records the treatment of Oriental

sores with carbon dioxide snow, a treatment that seems to have been very successful. "The Recollections of General Practice," by Surgeon Major-General Sir A. F. Bradshaw, K.C.B., K.H.P., are very instructive and in many cases rather humorous. The way the surgeon deals with children's ailments and troubles, and the manner in which he allays the maternal quailings, reveal the hand and mind of the master. The doctor who, when called upon to treat a child, replies, "Oh, I know nothing about children!" comes rightfully under the scornful purview of Sir Frederick. His statement that "I think that when a child of very tender age is supposed to be ill, the doctor should insist always upon seeing it quite naked" has a world of wisdom and shrewdness in it.

"Carrying a Wounded Man," "Army Biscuit Recipes," and "The Treatment of Syphilis with Salvarsan," are other interesting articles in the Journal. There is also a commendable notice of a French work on "The Ambulance Dog," the authors of which are Major Bichelonne and Captain Tolet, of the French Army. G. M.

Live Stock Journal. Published by Vinton and Co., Ltd., Chancery Lane, London, E.C. Price is.

This journal as usual is rich in records of pedigree stock breeding and exhibiting, and many prominent writers discuss the procedure that should be adopted by breeders to keep pace with the world's call for stock when the war is over. Mr. E. W. Robinson thinks that the funds for horse breeding should come out of the taxation of the realm, and if the thing is to be done properly the guiding finger points in this direction, but that farms for the breeding of horses should be limited only to the Midlands, Ireland, and the South of England is a proposition with which we cannot entirely agree. It leaves out of account many of the eminently suitable regions for rearing in Scotland and the North of England, places which for the production of hardiness, constitution, and stamina can hardly be beaten. Mr. G. Dickinson considers that the best and most economical scheme for the breeding of light horses is that started two years ago by the present Government and worked through the County Committee. Colonel Ricardo writes on the matter from personal experience, and we think that the words of the colonel, as quoted hereafter, go to the root of the matter and form a text which cannot be too often preached from and asserted. He writes: "When the war is over, I am of opinion we should have a strong National Council composed of practical men, not statesmen, but men who have no individual axe to grind, but who would put heart and soul into their work. A clear statement should then be drawn up and published, not sent to any Government department, who would only put it by in some pigeon-hole, but published as a blue-book, or any other colour that may be chosen, get some strong member to run it, and treat it as a National Bill. . . . Let us be quite certain that we get what we want; if we are to breed war horses, let us

do so upon practical lines." Major Nickisson calls attention to the stand-by that hunting has been to the Nation in the matter of horse supply for the present war, and advocates the organization of retired Army officers as Government horse buyers and to classify horses in given districts. Everybody interested in the future horse supply—and what veterinary surgeon is not?—will find from the articles in the journal much food for discussion and thought, and any narrow parochial view of the question will be perhaps remedied and deleted by reading the opinions of several men with diverse minds. The deep-thinking man with a knowledge of organization and administration will probably say that for real betterment in the production of a good supply of first-class Army horses there must be more cohesion and understanding between the Board of Agriculture and the War Office.

"The Cattle Outlook after the War" is discussed by Messrs. Stratton and Thomas. Mr. Matthews refers to the success following the Government's scheme for assisting the keeping of pedigree bulls of the Shorthorn class. Sheep and pigs have adequate space devoted to their interests, and the French basset hound has an article to himself. It is very interesting and instructive. The future of poultry keeping in days like the present, when production ought to be doubled or trebled, receives due and apt consideration. The journal is well illustrated, and ought to be in the hands of all agriculturists concerned in their country's welfare. We know of no investment that will return more profit at the present time for the sum of one shilling than the *Live Stock Journal* for 1915. G. M.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.

THE VETERINARY JOURNAL

MARCH, 1915.

Editorial.

OPERATORS AND OPERATIONS.

PERHAPS the title of "Veterinary Surgeon" given to us as a designation is not a misnomer, and although we occasionally meet a country practitioner who does not do his own castrating, and a town or city man who shies at performing a surgical operation, yet no class concerned in the healing art has a larger proportion of effective operators in its ranks than our own. Almost every day, or at any rate once or twice a week, most of us encounter conditions to remedy or alter which necessitate the use of the knife, scissors, curette, &c. Our patients, too, have to be taken as they come, and besides being of different races and breeds are frequently of varied temperaments. From the vicious and restless bull to the phlegmatic and stolid cart-horse; from the snapping and nervous canine pet of the lady to the brave and uncomplaining bull dog or fox terrier, and even from the scratching and biting cat to the quiet and passive fowl, we may flit within a short time on surgery bent.

All these proceedings put a certain strain on the activity, ability, dexterity, and nerve of the surgeon, and one of the first essentials of the lasting operator is to keep in good bodily health and condition. The smaller animals may be dealt with without so much strain on the system, and for a longer period than the larger; but in order to tackle a resentful or stubborn colt, an awkward cow, or a vicious bull we must be fairly sound in wind and limb. Good eyesight, too, is a vital attribute of the successful operator. The importance of keeping fit, then, has a value none of us should lose sight of.

Given equal qualities of hand, eye, activity, and intelligence, the man who has the more practice will become more perfect and acquire greater quickness and skill in surgery than he who has the less ; and there are, of course, operations, such as those for roaring, cryptorchidism, removal of the ovaries, Cæsarean section, &c., at which the general practitioner can seldom become very expert.

But, however small or great the procedure to be undertaken, the primary factor in its successful accomplishment will be the operator himself. To be up to date and skilful we must have a good knowledge of anatomy, and to this end the recent books on the regional structures and relations of different parts of the body indicate marked progress. Yet knowledge is no use unless we know how to make it available, and the proper application of clinical and theoretical study is to enable us to determine when to act, to what extent, and when to pursue a policy of masterly inactivity.

Passing nearer to the work the personal hygiene of the commencing operator ought to have due attention. Nowadays we know that asepticism and antisepticism must be practised carefully in order to ensure the best results in surgical work. Hands and clothing of the surgeon must be clean. A fresh wound made by us ought to be kept aseptic and an infected wound treated rendered free from infection by an antiseptic. Personally, we think all instruments before use should be submitted to boiling water for some minutes, and for veterinary surgeons we consider the handiest and most surgically correct way in which to use them is to take them as needed out of an enamel dish containing an antiseptic in solution. For this purpose we know of nothing better than dilute carbolic acid. There are many newer antiseptics, but few handier or more suitable for both instruments and operator. Shaving the skin and the use of iodine ought not to need mention. Without the former asepticism is not likely to be accomplished, and lacking the latter we miss one of our best safeguards.

An intelligent look all around will enable us to see what danger of wound contamination is likely to result from the surroundings of our subject. Carefully to castrate animals on what is practically a manure heap and to leave them there is only courting disaster, and this fact, notwithstanding the boasted spread of education, is often nearly as hard to drive into the head of the owner of an animal as it would be into that of the quadruped himself. The resting place of a patient after an operation should be clean, present and future

dressings sterile, and the air supply as pure as possible. The application of bandages needs intelligent consideration. As regards quickness of healing, there is much to be said for the free admission of oxygen to a wound.

Antiseptics applied daily must not injure the reparative process by acting deleteriously on the tissues. The advantages of dry dressings (which are bland) to wounds, and which remain longer in contact with the parts than lotions or oils, ought not to be overlooked. In pre-antiseptic days the rule was to keep every wound as dry as possible, and this rule is a good one to-day. The effect of the application of antiseptics in solution is quite commonly over-valued.

In many cases it is impossible to bandage wounds, and the need of a thin, delicate, and reliable antiseptic covering to protect a part from friction, or to keep it as quiescent as possible, has been felt by us. Recently we considered we had a good effect on the end of the tail of a Great Dane, on which we had operated, by painting it with hazeline and dusting it daily with a mixture of powdered Fuller's earth and boracic acid. A mixture of tincture of iodine, benzoin and glycerine might have done just as well. For the rest the merciful surgeon will make a plentiful use of local anæsthetics, such as ethyl chloride, cocaine, eudrenine (eucaine and adrenalin), novocain, quinine and urea hydrochloride. In dogs, the value of morphine sulphate as a general narcotic ought not to be overlooked, and chloroform administration ought to be still more generally adopted in surgical procedure than at present. Styptics are always valuable when operating, and perhaps there will be some advance made in the knowledge of these agents as a result of the war. Some progress ought to be recorded in surgical methods considering the large field in surgery at present open, and research work in the science and art should bring us some valuable and fresh information.

General Articles.

FOOT-AND-MOUTH DISEASE.

FOOT-AND-MOUTH disease is a contagious eruptive fever caused by a filtrable virus. The term "filtrable virus" is used to describe that class of disease-producing material which is capable of passing through the pores of a bacterial filter. The nature of such viruses is not yet definitely known, but in view of the nature of diseases caused by them it seems probable that they are bacterial. The causal agent of foot-and-mouth disease is probably too small to be seen, even with the aid of the highest powers of the microscope.

ANIMALS SUSCEPTIBLE TO THE DISEASE.

It may be said that practically all the domestic animals and wild ruminants can be infected with foot-and-mouth disease. This statement, however, requires a certain amount of qualification. Bovine animals are usually looked upon as more susceptible to the disease than sheep, pigs, and goats ; but the experience in Great Britain during the last few years has been that, given an outbreak amongst pigs or sheep, the disease spreads as rapidly as in the case of cattle. Human beings may also contract foot-and-mouth disease, though they are not in the first line of susceptibility. Horses, dogs, and cats have occasionally been known to contract the disease under natural conditions, but owing to the resistance they show to inoculation with the virus, and the infrequency of naturally contracted attacks of the disease amongst them, they must be considered much less susceptible than cattle, pigs, or sheep.

The degree of susceptibility varies considerably even amongst susceptible animals, and it has been observed not infrequently that certain animals appeared to resist infection when their fellows were suffering from the disease.

SYMPTOMS.

The duty of an owner is to suspect the disease. The symptoms are described here to enable owners to suspect the disease, and not with the object of encouraging them to attempt to differentiate between foot-and-mouth disease and other diseases with somewhat similar symptoms. Foot-and-mouth disease is so serious to stock-owners in general, that, if there is the least suspicion, it should be

reported immediately to the authorities. (See last section of this article on "Reporting the Existence of the Disease.")

The incubation period by natural infection is from forty-eight to seventy-two hours to ten days, but the shorter periods are the more usual.

The chief symptoms of the disease are common to all affected animals, although the effects of the virus vary somewhat. In the initial stage the animals are dull, off their food, and if the temperature is taken, it will be found to be higher than normal—105° F., or even higher in cattle. At this stage, however, it is unlikely that a farmer would suspect the existence of foot-and-mouth disease.



FIG. 1.—Feet of a pig affected with foot-and-mouth disease. The vesicles have ruptured and the horn is separating.

The first symptoms of this disease to attract the farmer's attention are the sudden appearance of lameness, or slavering at the mouth or both. Lameness in a number of animals, especially if present in more than one species—cattle and pigs, or sheep, for example—should arouse the gravest suspicion. Salivation (slavering) in a number of animals, or even in one animal, should always be looked upon with suspicion, and should lead to an examination of the mouth. In affected cattle salivation is very frequently accompanied by a smacking or sucking sound, which is a very characteristic symptom of the disease. Slavering, however, is not nearly so noticeable in pigs and sheep as in cattle, and it is usually sudden

lameness which first attracts attention in the first two. It is to be noted, also, that the lameness might escape the casual observer, as the animals are often so footsore that they remain the recumbent position. Cattle, however, when moving frequently shake their feet, as if trying to remove a foreign body. Sheep, of course will usually rise and move away when approached. If not, it probably means that their feet are very tender.

The lesions of the disease consist of vesicles or blisters which appear on the mucous membranes, especially that of the mouth, and and on the finer parts of the skin. In the mouth they are located on the pad, on the inside of the lip, and on the tongue. About the feet they are usually found around the coronet, at the junction of the skin with the hoof, at the base of the supernumerary digits, and on the soft tissue between the claws. They are also commonly found on the teats in females. Less commonly they may be seen around the muzzle, inside the vagina, and in pigs on the skin of the body. The vesicles vary in size and shape; quite commonly they are an inch in length, but they may be much smaller. They are easily ruptured by manipulation. When ruptured, a limpid fluid exudes, the mucous membrane over the vesicle looks ragged, and the under surface has a very red or raw appearance, which afterwards becomes yellow. On parts like the pad, where the mucous membrane is dense, the affected part of the mucous membrane may be much thickened, and may remain attached after rupture of the vesicle. On manipulation, this thickened portion of membrane comes away in the form of leathery-looking tissue, leaving a raw surface. About the feet the vesicles are similar to those in the mouth, except that the covering is denser. Cattle at pasture often show rapid emaciation when attacked, as, owing to the pain in their mouths and feet, they are unable to obtain sufficient nourishment. In milch cows the milk yield falls considerably, and when the teats are affected injury of a permanent nature may arise in the udder. The inflammatory process in the feet may lead to shedding of the horny parts. Such accidents arise in the later stages of the disease, and they are more commonly seen in sheep and pigs. Even in the earlier stages the horn can frequently be seen separating around the coronet in a downward direction in sheep and pigs. Very young calves may die from enteritis (inflammation of the bowel) without showing eruptive symptoms externally.

Animals usually recover from foot-and-mouth disease, but the

loss, owing to depreciation, loss of milk, or permanent injury, is considerable. Some outbreaks, however, are more virulent than others, and in a very virulent outbreak a considerable number of animals may die, usually from intestinal complications.

INFECTION.

The contents of the vesicles are infective, and it follows that material contaminated thereby, such as saliva, hides, foodstuffs, litter,

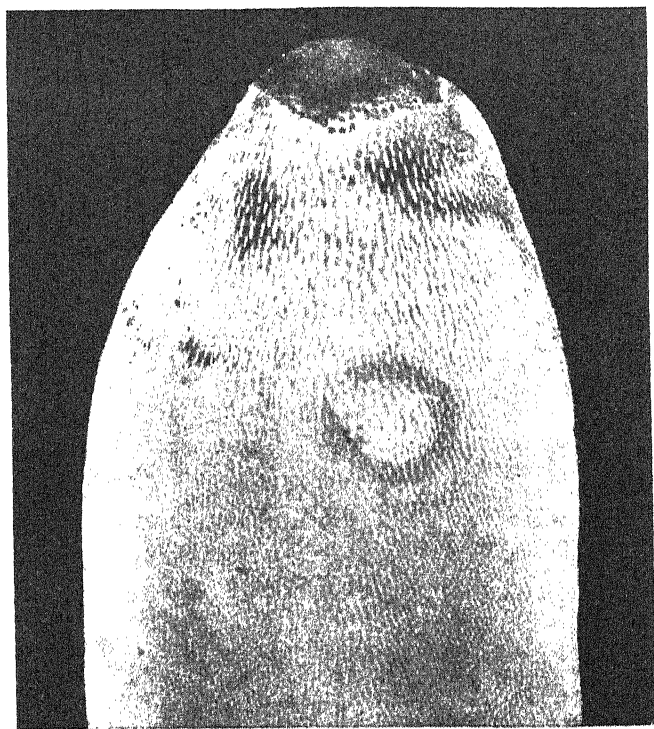


FIG. 2.—Portion of the tongue of an ox, showing early lesions of foot-and-mouth disease. The tip of the tongue shows a recently ruptured vesicle, while lower down an unruptured vesicle is seen.

dung, and milk, will also be infective. The blood has only been found infective in the earliest stages of the disease.

The virus of this disease is easily destroyed by antiseptics, and by such natural processes of disinfection as desiccation and sunlight. There can be no doubt, however, that under certain conditions which exist in nature, but which are not fully known, the virus may

remain active for months, and be carried long distances. This probably accounts for the mysterious outbreaks which have occurred in Great Britain without apparent relation to a previous case. A comparatively low temperature—55° to 70° C. (131° to 158° F.) destroys the virus. Infection is spread from animal to animal by cohabitation in stables or on the pastures, by the hands of milkers, or by the hands, boots, or clothes of other attendants. It may be carried considerable distances on foodstuffs, and through a water supply being contaminated. When an animal is salivating, the threads of saliva and straws contaminated thereby may be blown a considerable distance by the wind, and thus reach other animals, or a watercourse from which they drink. The roads along which affected animals have passed, and the wagons in which they have travelled, may remain infective for some time. Rats, fowls, birds, cats, horses, and dogs may act as mechanical carriers of infection, and the last three species have occasionally been known to contract the disease. It is also conceivable that human beings affected with the disease might convey it to animals. The spread of infection from place to place is most insidious. A good deal of evidence has been collected which goes to show that a human being may, through his garments, render the clothes of others infective. There is also a considerable amount of evidence that some animals which have recovered from the disease may be infective to others for a considerable time after recovery. The virus enters the body through the mucous membranes, and probably the commonest method of infection is by way of the alimentary tract. A very small amount of the material from the vesicles ($\frac{1}{100}$ th of a drop) has been found sufficient to cause infection.

PREVENTION.

It is not intended under this heading to deal with prevention in the sense of administering so-called preventive drugs, or resorting to preventive inoculation. There is no drug known which renders an animal resistant to foot-and-mouth disease, and science has not so far provided a practical method which can be used to immunize animals artificially. If the disease breaks out on any premises it is the duty of the owner to take all reasonable measures to prevent the affected or suspected animals, and those in immediate association with them, from coming in contact with those of his neighbours. The stock should be kept away from a public road, from a water supply

which reaches other farms, and from boundary fences immediately beyond which other stock are pastured. The attendants should be warned not to go amongst other cattle, sheep, goats, or pigs, and all

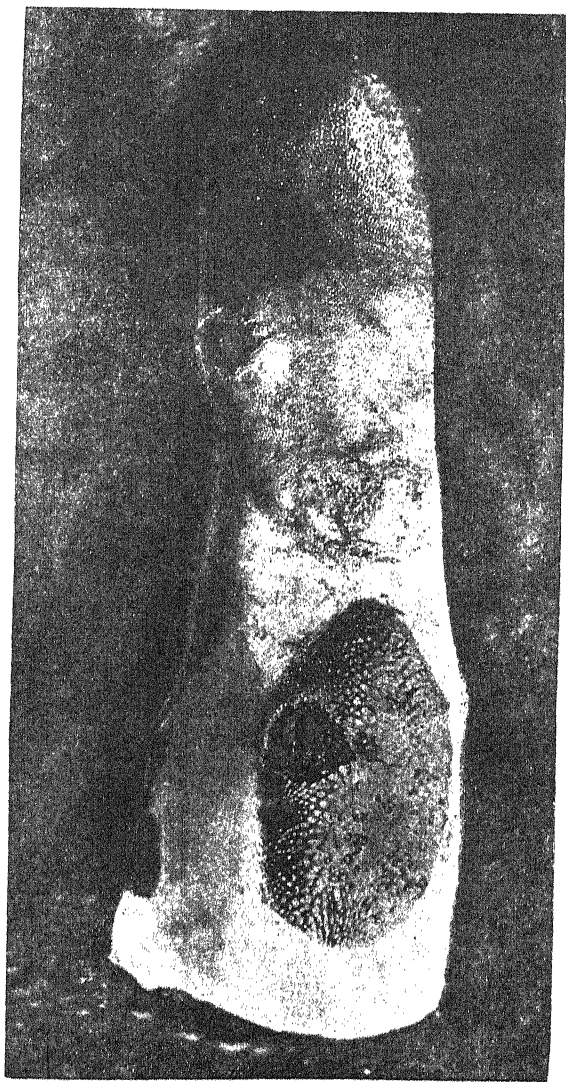


FIG. 3.—Tongue of an ox affected with foot-and-mouth disease, showing two recently ruptured vesicles and a considerable amount of scaling of the epithelial covering at other parts.

those who have to leave the premises should disinfect their boots before doing so, otherwise they may carry infective material on to

the roads or elsewhere. The boots should be scraped to remove particles of manure, and afterwards they should be swabbed with an ordinary disinfecting solution. If such is not available a saturated solution of common salt in hot water may be used. Milk should not be allowed to leave the premises, nor should it be given to other animals on the premises unless it has been previously boiled. Dogs and poultry should not be allowed to roam at large. The above precautions apply mainly to the owners of infected premises and any persons for whom they are responsible. It may happen, however, that other owners or their employes may find themselves on suspected premises before an outbreak has been declared. In such circumstances they should carry out the above-mentioned measures of disinfection, and they should refrain from attending to other animals until they have further disinfected their hands and changed their boots and clothes.

REPORTING THE EXISTENCE (OR SUSPECTED EXISTENCE) OF THE DISEASE.

The attention of stockowners is directed to Section 4 of the Diseases of Animals Act, 1894, and Article 1 of the Foot-and-mouth Disease Order of 1895, which in effect provide that every person having, or having had, in his possession or under his charge an animal affected with or suspected of foot-and-mouth disease shall, with all practicable speed, give notice to a police constable.

The object of immediately reporting any suspicious case is to enable the authorities at once to have inquiry made, and if disease is found to exist to isolate it and stamp it out before it can extend throughout the country. As the result of the disease spreading in 1869, it persisted in Great Britain until 1872, and it is estimated that 3,000,000 animals were attacked. An estimate was made of the losses sustained from the disease between 1870 and 1877 in Northumberland and Westmorland alone; in that period there were 9,035 outbreaks in these two counties, 236,755 animals were involved, and the loss approximated to £301,400.

The disease spread again in 1881-1884. In Great Britain 26,484 outbreaks occurred and 710,362 animals became affected, of which 9,361 died and 5,874 were slaughtered.

Figs. 1 and 3 are from the Report of the Departmental Committee on Foot-and-mouth Disease (Cd. 7270, price 4½d.).—Reproduced by permission from the *Journal of the Board of Agriculture*.

COCCIDIOSIS IN POULTRY AND GAME BIRDS.

By H. B. FANTHAM, D.Sc.LOND., B.A.CANTAB.

Coccidiosis in poultry and game birds has been known for many years to poultry raisers and game preservers under various names. These include "white scour," "scour," "white diarrhœa," "bowel trouble" and "enteritis," while more recently the malady has been described in current literature under its correct name coccidiosis. The disease in turkeys is known as "blackhead," and in some districts outbreaks among fowls are referred to as the "blue-head complaint." The disease is infectious, and has been responsible for considerable losses in poultry and game, not only in England but in different parts of Europe and in North America.

The cause of the disease is a minute animal parasite, named *Eimeria* (*Coccidium*) *avium*, that lives and multiplies within the lining of the alimentary canal of the bird infected, whereby the cells lining that part of the food passage in which the bulk of the digestion goes on are destroyed. The parasite in one stage is passed from the bird with its droppings, and, should these contaminate the food or drink swallowed by another bird, the second bird also becomes infected.

HOSTS INFECTED.

Numerous birds can harbour the parasite, and the malady may be spread from one kind to another by the excrement of those which are infected.

The chief hosts infected in England are fowls, turkeys, pigeons, geese, ducks, pheasants, partridges and grouse. A disease due to an allied organism, *Eimeria stiedæ*, occurs in rabbits and hares, producing an affection of the gut and also of the liver. The rabbit parasite is not communicable to birds.

Coccidiosis is most common among young birds, but mature birds may contract the disease with fatal results. Some birds seem to recover, but actually remain infected, though the parasites present are relatively few and do not seem to cause the host much inconvenience. These birds are, therefore, "chronics," and serve as an insidious means of spreading the disease to chicks they may rear, as well as constituting a danger to other birds with which they may associate.

SYMPTOMS.

The symptoms of coccidiosis of fowls, pigeons, turkeys, and ducks, as well as of game birds (many of which are hand reared), are

identical. Domestic poultry, when first infected by way of their food and drink, stand about much more than healthy normal chicks, droop their wings and utter plaintive cries. They eat and drink far more greedily than normal birds, but in spite of this they rapidly become thinner, the muscles of the breast and legs showing this more particularly. The loss of weight is striking. One instance is that of two fowl chicks, each of which weighed $7\frac{1}{2}$ oz. when one became infected. Two months later the infected chick died, its weight being 5 oz. The weight of the sister chick that had received exactly the same kind of food was then 1 lb. 6 oz. Many other instances of a similar nature have been observed.

In addition to loss of weight infected birds became markedly anemic, the comb, wattles and cere becoming pale and bloodless. The feathering also is weak compared with that of healthy birds. The leg feathering is often ragged, the quills are less rigid, the sheen on the feathers is less developed, and the replacement of nestling down by ordinary feathers is much retarded.

Owing to the attack of the parasite on the mucous membrane lining the alimentary canal, digestive troubles arise, and the feces of the bird become much altered in consequence, so that they serve as an indication of infection. The "soft droppings" of the bird come from the "blind guts" or ceca, and form a cap on top of the coarser food waste coming from the bowel. In healthy birds, the cecal droppings are relatively firm, but in infected ones they become much more fluid, and are diarrhetic in character. They are also much paler in colour, at times approaching pale yellow, or, if contaminated with a little of the kidney secretion, white—hence the name "white diarrhoea."

Occasionally infected birds have a discharge of whitish material from the mouth and nostrils, and even the eyes and ears. A foul smell also is noticed on opening the beak. The heads of turkeys and fowls, and of some other birds, such as grouse, may take on a bluish tint. These features are not universal.

Death from coccidiosis is often sudden, and the birds may be feeding greedily half an hour before they die of the disease. The sudden death of chicks from coccidiosis in the open is often responsible for the spring dwindling that seems so mystifying in the case of game birds, and in some cases coccidiosis is responsible for the death of young chicks and ducklings, where the disappearance has been ascribed to rats.

DISTRIBUTION OF THE PARASITE IN THE HOST.

Eimeria (Coccidium) avium is a small parasite endowed with a great capacity for existence under unfavourable conditions for long periods and with an enormous capacity for penetrating, multiplying within, and destroying the delicate mucous membrane of the alimentary tract of its host. The whole food tract is not infected as a rule, but cases have been known in which every part of the intestine has been literally riddled with parasites and reduced to a pulp. The most important digestive processes in the bird occur in the duodenum, that part of the small intestine immediately connected with the gizzard, and the duodenum is one of the most heavily infected parts of the food canal. The parasites multiply in the tissue of the duodenum, break through into its cavity, and then pass along the food canal usually until they reach the paired caeca, or "blind guts." Here a suitable environment is reached again, the parasites penetrate the lining and active multiplication begins again. The invaded caeca become very thin while their blood-vessels are greatly engorged, as are those of the mesentery. At the same time the cavities of the caeca become much distended. The hind gut or rectum, which serves chiefly for the collection and consolidation of excrement prior to its expulsion from the body, is rarely infected by the parasite.

In turkeys that have been infected for some time some of the parasites leave the duodenum, pass up the bile duct, and enter the liver. They behave there as in the intestine, and form masses which have a whitish, cheesy appearance, and suggest tubercle. On pressure or puncture a thick milky fluid or a whitish cheesy mass exudes. A similar condition is seen in the livers of rabbits affected with coccidiosis, and in all the cases, the contents of such areas in the liver consist of masses of the resistant forms of the parasites that are destined to reproduce the infection in new hosts. Sometimes the livers of fowls infected with chronic coccidiosis show the same appearance as those of turkeys. Liver infection occurs more usually in adult than in young birds.

THE LIFE-HISTORY OF *EIMERIA (COCCIDIUM) AVIUM*.

If a very small portion of the excrement of an infected bird be examined microscopically, a number of small, oval, shining bodies mingled with food *débris* are seen (fig. 1). The small oval bodies

are about $\frac{1}{40}$ – $\frac{1}{20}$ millimetre long and $\frac{1}{60}$ – $\frac{1}{30}$ millimetre broad. They are the resistant forms of the parasite, termed oöcysts or cysts. Young cysts show the contents filling them; older ones have divided internally into four rounded or oval bodies called spores, each of which in turn forms two curved primary infecting germs or sporozoites (fig. 1, A—D). When a bird has swallowed some oöcysts

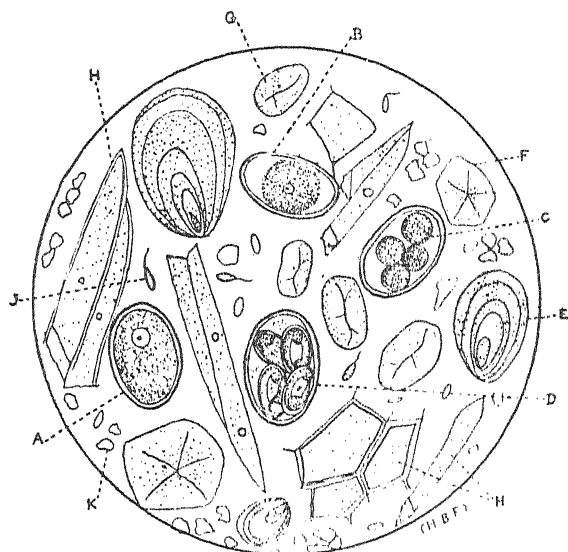


FIG. 1.—Portion of feces of a fowl chick infected with coccidiosis, as seen when examined under the microscope. Magnified 500 times.

A—Oöcyst (cyst) of *Eimeria* (*Coccidium*) *arium* with contents filling it.

B—Oöcyst with contents forming a sphere.

C—Oöcyst with contents forming four small spheres, each of which is a young spore.

D—Oöcyst with four spores within it. Each spore contains two curved primary infecting germs or sporozoites.

E—K—Various kinds of only slightly digested food.

E—Potato starch grains, somewhat like oyster shells.

F—Maize starch.

G—Rice starch.

H—Cells from husk of grain.

J—Outlines of living, harmless bacteria from the fowl's gut.

K—Very finely ground pieces of food.

with contaminated food or drink, the oöcysts remain unchanged until they reach the duodenum of the host. Here, under the influence of the powerful digestive juices of the host, the cyst and spore walls become softened and the sporozoites escape. They rapidly pass to the wall of the gut (fig. 2, spz.), where each attaches itself to an epithelial cell of the lining and proceeds to bore its way inwards. Once inside, the parasite becomes rounded and

grows rapidly, feeding at the expense of the cell it has invaded. This growing, feeding phase is known as the trophozoite (fig. 2, par.).

After the trophozoite has attained its maximum size, it commences to divide. It is now termed the schizont (fig. 2, sch.), and, by the division of the schizont, a cluster of daughter forms or merozoites is produced (fig. 2, mz.). These are arranged in a group like the segments of an orange. Each bears a general resemblance to a sporozoite (fig. 2, spz.), though differing in details. One schizont

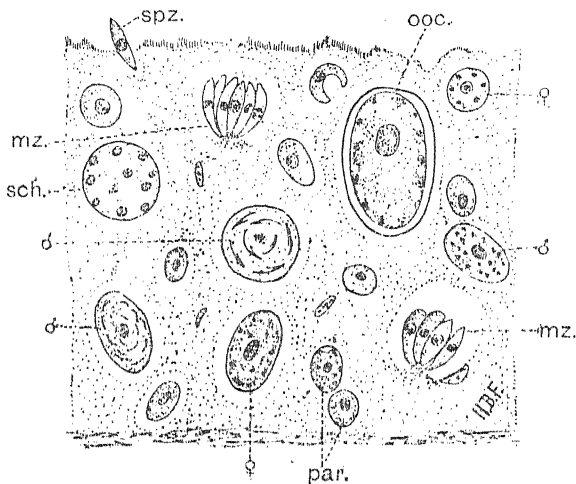


FIG. 2.—Portion of the blind gut or cecum of a young grouse infected with *Eimeria (Coccidium) avium*, showing the lining epithelium riddled with parasites. Many stages in the life-cycle of the Coccidium are shown in section therein. Magnified about 750 times.

- par.—parasite—growing, feeding form (trophozoite).
- spz.—sporozoite, or primary infecting germ.
- sch.—schizont, or dividing form, for increasing the number of parasites in the bird.
- mz.—merozoites, or daughter forms.
- ♂—microgametes, or male elements of various ages attached to the male parent cell.
- ♀—female parasite, or macrogamete.
- ooc.—young oöcyst, or cyst.

usually produces from eight to fourteen merozoites, but as many as twenty have been found. A large increase in the numbers of the parasite is thus brought about. The merozoites soon separate from one another and each proceeds to pierce another cell, round itself, and grow again, till in time it becomes a schizont, and itself produces more merozoites. The result of this multiplication (or schizogony) of the parasite is the reduction of the gut lining to an almost structureless mass, and consequently serious digestive derangements, accompanied by acute inflammation of the intestine (enteritis), occur.

In most cases some of the merozoites pass down the lumen of the gut and enter the caeca, where they pierce the cells and multiply just as in the duodenum.

After several generations of merozoites have been produced a limit is reached, both to the multiplicative power of the parasite and also to the capacity of the host to provide the invader with nourishment. Consequent on this, the *Eimeria* commences to prepare for life outside the body of the host and to produce sexual parasites, by whose union the resistant forms (oöcysts) are produced. The male and female *Eimeria* are ultimately very unlike each other, and the processes leading to their formation are termed gametogony.

Both the male and female progenitors are really trophozoites that become modified. The female form becomes a large, oval body, crowded with granular food material. Each individual is a female-mother-cell (fig. 2, ♀) and is destined to become a single female or macrogamete. The second form is somewhat smaller, and is far less granular than the first. It is the male-mother-cell (fig. 2, ♂), but it gives rise to a large number of males or microgametes. When the female-mother-cell has grown almost to its full size it forms a hard coat (the cyst or cyst-wall) around itself. This cyst-wall is tough and resistant, but a thin spot or micropyle is left in it, and, by means of this, the male can enter at the time of fertilization.

The males are formed as a network over the surface of the male parent cell, and gradually separate from the bulky remains of the parent cell. They are extremely small, being about $\frac{1}{320}$ mm. long. Each possesses two extremely fine lashing flagella, by which it swims about in search of the female.

Fertilization has been watched in life. When the female has reached its final size, it often comes to lie close to the cavity of the gut, with its micropyle directed outwards. The microgametes or males break free from their parent cell, swim away vigorously and swarm round the micropyle of the female. One at length succeeds in entering, the micropyle at once is blocked up and thickened, and the excluded males speedily die. Very complete fusion of the two gametes (or sexual individuals) occurs, and the result is the formation of the oöcyst (fig. 2, oöc.). Fertilization may also occur in the lumen of the gut.

The oöcysts at first have their contents completely filling them. As they get older the contents become concentrated into a spherical

ball, which then divides into four oval masses. The latter form coats for themselves and become spores, within each of which two sporozoites or infecting germs ultimately develop (fig. 1, A—D). Thus the life cycle is completed ; its period is from eight to ten days.

SIGNIFICANCE OF THE DIFFERENT STAGES OF THE PARASITE.

It is of great importance to note that the period of the schizogony, or multiplication, of the parasite is the most critical time for the infected bird, since during this period there is great derangement of the digestive processes and acute inflammation of the intestine. The very taking of food merely irritates the already partially destroyed mucous membrane, yet the bird eats ravenously.

Coccidiosis set up in the duodenal wall is probably sufficient to kill very young birds, while older birds that may have partially recovered from duodenal coccidiosis, succumb to coccidiosis in the caecum (typhlitic coccidiosis).

The onset of sporogony of *E. avium* usually means either the recovery or the death of the infected chick. When the infection has not been very acute, the oöcysts pass from the body, and the internal gut-lining may be able to regenerate, when the bird improves and begins to gain in weight. Sometimes infiltration of connective tissue into the lesions formed by the parasite aids in this recovery. When the attack is acute, too much epithelium is destroyed by the merozoites and by the outward passage of the oöcysts, and, as a result of the complications arising therefrom, the bird dies.

MODES OF SPREAD OF COCCIDIOSIS.

Coccidiosis is a disease that spreads with great rapidity, and there is no doubt that the faeces of infected birds are the chief source of contamination. The direct contamination of grass on an open poultry run or in the more confined space of a pen or yard is easily brought about. The removal of excrement is essential, not only where disease is suspected, but in all circumstances. Should droppings of infected birds remain on the soil, even though the stock is removed, recurrences of epizootics are probable. The droppings containing oöcysts crumble into a fine dust that contaminates the immediate neighbourhood, and is also distributed over larger tracts of land by the wind, thus increasing the area of infection. Infected dust deposited on the food plants of birds such as pheasants, grouse,

or partridges, is easily taken by the birds, and outbreaks of disease occur among them. Infected faeces have been kept as a mass for four years, and have then been found still capable of producing infection.

Water also is an agent of spread of coccidiosis. Infected faeces are washed down by heavy rain into pools or other drinking places, where they remain; or even if they are only washed into the earth, the soil is contaminated, and may serve as the grit necessary for healthy birds under normal circumstances. Oöcysts of *E. acutum* have been collected from small tarns and pools habitually used as drinking-places by chicks, while the dew from heather has been found to contain oöcysts after outbreaks of coccidiosis in the neighbourhood. Again, these infective cysts are very resistant to water, and it has been shown experimentally that even forty days' exposure to water does not kill the encysted parasite. When it is remembered that young birds are far more susceptible to coccidiosis than older ones, the provision of uncontaminated food and drink becomes of the utmost importance.

It has previously been mentioned that certain adult birds become chronics. They are then veritable reservoirs of infection, and a source of danger to young and old birds alike, at all seasons of the year. It may be stated that as fowls, turkeys, pigeons, grouse, pheasants and partridges are all attacked by *E. acutum*, there is always danger from fowls used as foster-mothers, and outbreaks among chicks of each kind of bird have been traced to the agency of chronic infected foster-mothers. In one case fifty fowl chicks died of undoubted coccidiosis within a few days. It was found that they had been reared with others by hens obtained from an estate where there had been heavy mortality the previous year. The foster-mothers were isolated, their faeces examined daily, and, in a very short time, two hens were discovered whose faeces showed daily crops of oöcysts. These birds had evidently become chronics, and their excrement had contaminated the large grass run. Washings of the herbage in the run also yielded oöcysts when examined microscopically. This outbreak ceased without further loss after treatment, destruction of the infected foster-mothers, and removal to a new clean run at some distance from the old one.

Mutual infection of various birds can occur. Fowls reared on ground where turkeys suffering from "blackhead" have been raised and, conversely, turkeys raised on runs where "white diarrhoea" in

fowls has occurred, become infected with coccidiosis. Pigeons feeding in infected fowl yards themselves become infected, and whole cotes have been exterminated by coccidiosis thus acquired.

Birds such as sparrows will obtain grain wherever they can. When they feed in infected places they can take up oöcysts of *E. avium* with contaminated food. Frequently the parasites pass through the bodies of small birds, such as sparrows, unchanged, but they are voided with the faeces elsewhere and so may serve as new centres of infection.

Other distributing agents for coccidian oöcysts in nature are the flies that feed on excrement. The cysts pass through their bodies unchanged, and are voided with their faeces, but the sojourn within the body of the insect in no way impairs their vitality, and they are quite capable of infecting young poultry or game if taken up by them.

PREVENTIVE MEASURES.

There is little doubt that "prevention is better than cure" in dealing with coccidiosis, and this is more particularly the case when dealing with poultry and with game-birds, such as pheasants, reared under semi-domesticated conditions. Sanitation in every detail must be insisted upon.

In the case of an outbreak it cannot be too strongly emphasized that all dead birds should be burned and not buried. Every buried bird is a new source of infection, and the polluted soil is distributed over wider areas by earthworms, carnivorous beetles, flies, moles, &c. Burning is the most successful method of dealing with coccidian oöcysts which are able to mature within the dead bird.

All droppings of birds in captivity should be removed regularly and thoroughly. These, too, should be burnt and not buried when disease is known to exist.

In the case of birds either partially or entirely under domesticated conditions, fouling of food and drink should be prevented as far as possible; this can be achieved to a considerable extent by providing movable feeding boards; food and drink should be placed on these boards, which can be removed and thoroughly cleansed. The pens should be so constructed that daily easy cleaning is possible; frequent lime washing of coops, perches, &c., is very useful.

Wherever possible, healthy birds should be taken off the infected

areas, and their coops, &c., placed in new positions as remote from the old ones as possible. The fouled soil should then be treated with fresh quicklime, which, after an interval of about a week, should be well dug into the soil, the latter being turned to a depth of at least 1½ ft. No birds should be raised on this land for at least a year. Where the infected run is relatively small, the top soil can be removed to a depth of 3 or 4 in. and then turned; but even if this is done, it is advisable to lime the soil. If the birds are very heavily affected it is useless to remove them to fresh soil. It is much better to destroy them, and place healthy birds on fresh, unpolluted soil.

As sparrows, finches, and other small birds are known to spread coccidiosis, they should be excluded from runs or yards where disease is known to exist. Old netting can be utilized for this purpose. Pigeons should also be excluded from fowls' feeding places as far as possible.

Wherever possible, eggs should be disinfected before they are set for hatching. Strong methylated spirit can be used for rapidly wiping the eggs, and will be found efficacious. The eggs should be carefully and quickly dried after this treatment.

Fowls and turkeys should never be reared on grounds where much mortality from "white diarrhoea" or "blackhead" has been known to occur. If the original occupants of the land were turkeys, the oöcysts of *E. avium* producing "blackhead" would foul the soil, and, when taken up with food or drink by fowls, would produce the "white diarrhoea" or coccidiosis of fowls, especially if the birds were young.

When broody hens are to be used they should be isolated and kept under observation for a few days before use. Any with unusually fluid faeces should be rejected.

To sum up, sanitation applied in its most exact form in all directions is not only the best preventive of disease, but results in healthy stock maintaining their vitality and increasing their vigour.

DIET AND TREATMENT.

With regard to treatment, any condition that tends to raise the resistant powers of the chick is of service and should be used. So far as feeding is concerned, local conditions often determine the particular procedure followed. The use of moist food as contrasted with dry feeding prevails in some districts, but, so far as ascertained,

there does not appear to be much evidence in favour of one method over the other so far as the treatment of coccidiosis in adult birds is concerned.

Tonics are of some service as tending to raise the general vitality. Ten grains of sulphate of iron (green vitrol) added to one gallon of drinking water is useful, and the same quantity of salicylate of soda or salicylic acid has also been of service in some cases.

Where whey or buttermilk is available, it can be utilized with advantage for poultry suffering from coccidiosis. Sour milk in small amounts is also useful. As the lining of the alimentary canal is badly injured in coccidiosis, very finely crushed dry food or well-softened (scalded) moist food is recommended for chicks. If moist feeding is adopted, the food can be made up with whey or buttermilk with advantage.

For some years past the writer has experimented in the treatment of avian coccidiosis by means of catechu. Ten to fifteen grains of crude catechu are dissolved in one gallon of water. The dark sherry or ale-coloured solution so obtained is given to the birds as drinking water. The solution often darkens in air, but its usefulness is not impaired thereby. The birds drink it greedily and rapid improvement generally follows. The treatment is usually only necessary for about ten days. Fowls, ducks, pigeons, hand-reared pheasants, partridges and grouse in captivity have all recovered under this treatment. Although the objection might be raised that catechu is merely an astringent, the success of the treatment where properly tried has justified its general use.

Many other treatments have been devised and tested by the writer during the last few years, but where efficacious they were either too expensive or too difficult of administration for general application. No attempt to find anti-serum treatment for avian coccidiosis has yet been successful.

In conclusion, it may be mentioned that rabbits sometimes suffer from coccidiosis. If the symptoms are at all obvious (and they often are not) much benefit accrues from taking precautionary measures and instituting treatment on the same lines as have been recommended for avian coccidiosis.

The above investigation was aided from funds placed at the disposal of the Board by the Development Commissioners.—Reproduced by permission from the *Journal of the Board of Agriculture*.

EPHEMERAL FEVER OR THREE-DAYS' SICKNESS
IN CATTLE.

BY W. KENNEDY, M.R.C.V.S.

British East African Protectorate.

SEVERAL outbreaks of this disease have recently been reported on farms in the neighbourhood of Nairobi, and as the literature on the subject is scattered throughout various journals, the following short *résumé* of what is known of the disease may be of interest and value to stockowners in this country. The principal writers on the subject are Veterinary Surgeons Bevan and Freer, of Rhodesia and Cape Colony respectively, and we are indebted to the writings of these gentlemen for most of the following information.

The disease first came under notice in North-west Rhodesia in November, 1906, and four months later it had spread to the Transvaal and Natal. It appears that "three-days' sickness" has been existent for years in Central Africa, and Freer is of opinion that it is only on account of the country being opened up to traffic that the disease has commenced to spread in new areas.

The Bahema in Ankole (Uganda) described a cattle disease in 1911 under the name of "kabohi," the symptoms of which, as described by them, appeared to be identical with those of "three-days' sickness." The Masai also describe a similar disease.

The scientific term "ephemeral fever," as well as the lay term, "three-days' sickness," are both somewhat appropriate, as in the great majority of cases the disease quickly runs its course, and all acute symptoms have disappeared at the end of three days.

CAUSE AND MODE OF INFECTION.

Ephemeral fever is due to the entrance into the system of a specific organism, and can be transmitted to a healthy animal by inoculating blood drawn from a sick animal. Cattle of all breeds, and in all conditions, are susceptible to this disease. Young calves seem to possess a greater resistance to natural infection than older stock, and fat, stall-fed cattle usually show more acute symptoms than those in low condition. The period of incubation after inoculation with virulent blood is two to three days, and one attack of the disease confers an immunity which lasts for six

weeks. The blood of a recovered animal is not infective. It has been suggested that the disease is insect-transmitted. So far, transmission experiments with ticks have failed.

SYMPTOMS.

The earliest indications of an attack are loss of appetite, suspension of rumination, a rise of temperature, with roughness of the coat, a watery discharge from the eyes and nose, and, in the case of milch cows, suspension of lactation. These symptoms develop rapidly, and in a few hours the temperature may reach 106° F. Painful lameness appears in one or more limbs, and the lameness may rapidly pass from one limb to another, or there may be general stiffness of the whole body. The stiffness of the neck, with more or less inability to swallow, is very characteristic. The mucous membrane of the mouth becomes reddened, the eyelids swollen and the eyes glaring in appearance. In the majority of cases the bowels are constipated, the fæces being covered with strings of mucus. In cases where the animal lies down there is inability to rise, and when placed on its feet there is evidence of loss of power, and the animals quickly resumes its recumbent position. In about forty-eight hours the temperature falls nearly to normal, appetite returns, acute symptoms disappear, and in the greater percentage of cases the animal is convalescent at the end of three days. The only constant *post-mortem* lesion of importance is enlargement of the lymphatic glands, particularly those in front of the sternum or breast bone.

MORTALITY.

The mortality from the disease itself is almost *nil*. When animals are suffering from stiffness of the neck, and owners persist in drenching them, there is a grave risk of death resulting from pneumonia owing to the animals being unable to swallow properly and the drenches going down the windpipe instead of the gullet.

IMMUNITY.

Freer states that although in a large percentage of cases one attack confers an immunity for a considerable time, still, numerous cases have come under his notice where cattle have had two and three attacks. In the majority of cases the second attack is worse than the first.

TREATMENT.

The less the patient is interfered with the better will be the results. The sick animal should be put in a cool, shady place and made comfortable. If the bowels are over constipated a dose of Epsom salts would be beneficial, but great care should be exercised in administering it, especially when the neck muscles are affected. Transport oxen should not be inspanned for at least a fortnight after recovery as they are quite unfit for work before that time.—*Agricultural Journal of British East Africa.*

HINTS ON TRANSPORT WORK.

By CHARLES C. ABRAM, M.R.C.V.S.

Walsingham.

HAVING had considerable experience in the travelling of horses at sea in various parts of the world, I am writing a few rough notes in the hope that they may prove of some service to the younger and more recently qualified men to whose lot it may fall to take veterinary charge of cargoes of remounts during the present hostilities.

In purchasing large quantities of animals in more or less limited time, in order to find a cargo for a boat the detention of which may cost a very large sum per day, in demurrage, and in order to keep up the fresh supplies of remounts necessitated by the incessant wastage of warfare, the novice will naturally find it impossible to put the time and *minutiae* into each individual animal which would be possible were he examining only a few racehorses, say, worth several hundred pounds apiece; yet with the method to be described it will be found that with ordinary care no radically unsuitable or unsound animal need be found among his selection.

After a preliminary examination of the horses in the stables, it is the writer's custom to have a number trotted round in a circle, he standing meanwhile in the centre, as is done by the judge at a horse show. It is then comparatively easy to divide the unconscious candidates for campaigning hardships into two classes: (a) *The obviously unfit*—either from size, action, conformation, or vice (and I may add in parentheses that it is unfair to expect the average trooper to ride an animal that a rough-rider would shake his head at); and these being discarded, a second contingent is left for after

consideration ; (b) thus leaving a residuum of those animals which are, more or less, of the desired type.

These latter are then examined for soundness, and if sound, and if they meet with the approval of the purchasing officer, they are branded on the hoof, as an outward and visible sign of their being destined to be (bar accidents) the mounts of those whom His Majesty the Kaiser is humane enough to describe as "cannon-fodder" !

It will then be time for another look at those left for further consideration, when the same procedure will be followed, and so on until the number of horses submitted to inspection is exhausted. And "right here" (as the Americans say), while I think of it, let me warn the novice against "passing" a horse which has been discarded on a previous occasion. Many unscrupulous vendors will bring up a horse which has "failed to pass," more or less disguised (by "pulling," trimming, clipping, &c.), two or three times at intervals, in the hope of catching the examiner unawares ; and few things are calculated to make the novice look more foolish than to accept one day an animal which he has rejected on another.

Having thus cursorily glanced at the duties and methods of the examining veterinarian, let us turn to the still heavier responsibilities of the man in veterinary charge of a horse-boat. Once detailed for that duty, a wise precaution is to make as thorough an examination as may be of the scene of one's future labours, with a view to having any little alterations made, in structure or arrangements, which may be deemed advisable. This may generally be accomplished with a little tact, especially if the chief officer prove as obliging an individual as the great majority with whom the writer has come in contact have turned out to be ; and it should be remembered that little things which count for inconvenience, or worse, at sea can often be rectified in port at a trifling expenditure of either time or money, though if overlooked or neglected they might make considerable difference to the success of the voyage.

A careful examination of the temporary surgery, which has probably been rigged up somewhere "aft," will most likely reveal a woeful deficiency in one's favourite specifics, and make one heartily wish that Messrs.—(but no ! I must refrain from giving them a gratuitous advertisement)—were within telephonic reach, but as they are not, some more or less efficient substitutes can possibly be procured ashore, and this should by no means be overlooked, since

few things are more worrying than to have a bad case at sea—to know that it is going from bad to worse, and to be all the time reflecting—“If *only* I had so-and-so!”

Now comes a still more important matter. One may, with more or less complacency, “throw physic to the dogs,” according to individual idiosyncrasy, but no one will deny the all-importance of *diet*.

It would be beyond the scope of this article to enter into a dissertation as to the various food values of the different foodstuffs, as the providing of the fodder will not fall within the travelling veterinary surgeon's province. But it will naturally be his first consideration to ensure that the fodder which may be on board shall be dry, sweet, and clean, and of good substance and colour, before sailing; as it is obviously futile to hurl imprecations at a defaulting contractor's head when one and one's charges are in mid-ocean, thousands of miles, it may be, from the nearest corndealer's.

In this connection it may be noteworthy that hay may become damp before or while being shipped, and is thus liable to be mouldy, in which case one may reasonably expect digestive troubles. Here, once again, a little forethought and trouble in port may save many an anxious hour at sea.

It is the general experience of shippers, I think, that horses do better the first day or two on a light diet—say bran—bran and boiled linseed mash, with a little long hay; and it is a common practice, which may or may not be advisable, to introduce a small dose of mag. sulph. into the mash or drinking-water, and then, as the horses get their “sea-legs,” to get them on to their corn gradually, the amount given daily naturally varying with the size of the animal, &c., the well-worn platitude being borne in mind that, when more food is introduced into the stomach than can be readily digested, the action of the gastric fluids is retarded, and that chemical changes ensue which may lead to fermentation, and have flatulent colic as a possible result.

On the other hand, insufficiency of food (which may readily happen from the carelessness of the casual ship-horsekeeper, resulting in one horse having too much and his neighbour too little) will, of course, tend to promote debility, and a corresponding predisposition to contract any epidemics (*e.g.*, strangles) which may be latent, and which are obviously difficult to deal with at sea, if only on account of the practical impossibility of strict isolation.

It is not the writer's intention in this brief article to enter into the subject of the relative weights or proportions of albuminoids, carbohydrates, fats, &c., or into any other dietetic details, which the inquirer can obtain to better purpose from any text-book on the subject. Let it suffice for him to suggest to the novice the advisability of systematic (but irregular as to *route*) patrolling of decks during feeding and watering times, and the necessity of keeping a careful eye upon the *condition* of his charges.

Wonders can be worked sometimes by giving those unfortunates which are stabled next to the boilers, or in the lower hold, a change to a cooler spot, while it is very advisable to have a "bone-yard," or convalescent home, well forward in the "fo'c'sle," or near a port-hole, where the invalids may enjoy plenty of daylight and the revivifying breezes straight from the ocean, without, of course, incurring undue risk of draughts or of wetting from spray. And in this connection, the help of coco-nut matting in giving a nervous or awkward horse a good foothold in the alley-ways, while changing from stall to stall, should not be forgotten.

A word in conclusion as to the staff. The practitioner may possibly (though in this campaign improbably) have an Army farrier or two on board to assist. If that be so, and his experience be like that of the writer, he will find them "a very present help in time of trouble." If not, he must do his best with the material to hand, which may vary from the reliable, conscientious hard worker to the shirking scoundrel, who cuts tails for the sake of the hair, does as little work as possible, and who has a tendency to smoke anywhere he can find to hide in (including the fodder holds), with a sublime indifference to the safety of the ship, even though his own worthless carcase be part of the cargo.

A punishment for this offence, which the writer found efficacious, was to handcuff the offender to the ship's rails for a few hours—full in the tropical sun—a disciplinary measure which possibly gave him a foretaste of the temperature of his eternal destination, but in this connection the novice for whom I am writing should remember that, in the end, all power to inflict punishment—all authority begins and ends in the captain of the ship, who is the autocrat of autocrats, when once in "blue water."

Finally, the writer may perhaps be allowed to allude to the necessity for the strictest cleanliness possible, in the stalls and elsewhere, to the advisability of clipping long-coated horses in warm

climates, and to express the hope that the mistake made in the South African War will not be repeated in this campaign, viz., that of subjecting horses to prolonged and severe exertion when fresh from a long sea voyage, after having been for some time deprived of all exercise. The military necessity in South Africa for the immediate working of freshly, or comparatively freshly landed animals, was probably the cause of an immense waste of horse-flesh, not to mention the vast amount of animal suffering involved. But such considerations are alike beyond the scope of this article, and the needs of the potential tyro for whom it is written, besides being a superfluous encroachment upon valuable space.

THE MULE IN THE ARMY.

It would appear from the quality of the latest arrivals of mules here that they are to be used for cavalry purposes. The lot at Epsom are declared by experts to be as clean as polo ponies, able to gallop, and quite big enough for the purpose—they are about 14 hands 2 in. high. They would outrun any of the heavy stamp of horse, of which there are plenty left, whilst horses suitable for cavalry purposes are scarce all over the world. Mules, of course, are used by Spanish and Mexican cavalry, but they have not hitherto been used in the British Army except for transport and for mountain batteries. The likelihood is that there will be a revival of the mounted infantry idea, to take light cavalrymen who are now working in the trenches from place to place where motor traffic is impossible. Sir Garnet Wolseley in 1872 foretold something of the kind in his "Wellington Essay," where he said that mounted infantry on mules or even in carts, accompanied by a small proportion of real cavalry, would be of signal use in days to come. The mules and ponies that formed the whole of Sir Frederick Roberts's transport from Kabul to Kandahar—he had no oxen or camels—carried two "maunds," which is about 160 lb., but were capable of carrying much more. A mountain battery mule's load runs up to 220 lb., but he is never as big as even 14 hands.

Clinical Articles.

DEATH AFTER APPARENT RECOVERY FROM STRANGLES IN HORSES.

By J. F. D. TUTT, M.R.C.V.S.

Winchester.

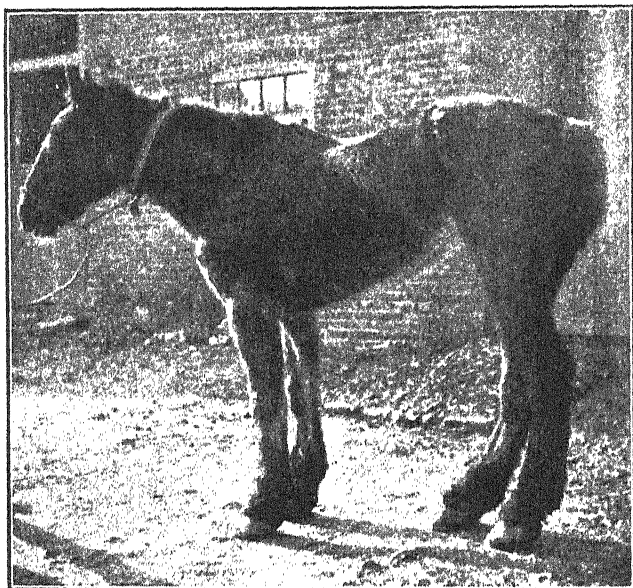
THE subjects have been in every case horses of five years of age and over. After the external lesions have healed, and the patient seems to be on the road to early return to work, a loss of condition, which is usually very rapid, is observed. No medicinal



remedies appear to be any good. The same remarks apply to vaccines. The appetite usually remains quite good. Death has been in nearly every case sudden. When death has been observed, the animal has fallen dead as if shot; in some cases the animal has even been eating at the time of death.

POST-MORTEM.

The constant lesions have been: extensive stranglers, abscesses in the lung tissue and in the bronchial lymphatic glands. In one



case there were abscesses along the cervical portion of the trachea in addition to the usual lung lesions.

The accompanying photographs show very well the emaciation that usually heralds a fatal termination.

OBSERVATIONS OF A PRACTITIONER.

By J. W. POLLOCK, M.R.C.V.S.

(1) MYELO-MENINGITIS IN A TWO-YEAR-OLD COLT.

THIS case occurred on a hill-farm, which is badly infected with "louping-ill," or "trembling," amongst the sheep. James Law, in Vol. IV of his "Veterinary Medicine," states that "the succession of symptoms in 'louping-ill,' or 'trembling,' in sheep are in the main such as are observed in other cases of myelo-meningitis." As there was no other origin of the disease to be discovered in the case, I came to the conclusion that the cause must be the same as that of "louping-ill," which is very prevalent on the farm.

W. Williams claims to have heard of cases of "louping-ill" in horses (J. Law, Vol. IV). The disease is not uncommon in young cattle on the hill-farms only of this district in Dumfriesshire. The symptoms observed in the case of the colt were very pronounced. When first seen he stood propped on his legs, and when moved he did so stiffly and uncertainly—just as in what is commonly called "staggers." The colt had been on a bare hill pasture and was getting no corn or other food. In a day or two hyperæsthesia and oposthotonos were well marked and there was some hyperthermia; the back became quite hollow, and the colt "trembled" when approached. When walking the feet were lifted up rather sharply and brought to the ground again uncertainly, whilst the hind quarters swayed from side to side. A few days later paralysis followed and was complete in the limbs. As recovery was now not to be looked for the colt was destroyed, but, unfortunately, I had not an opportunity of making a *post-mortem* examination. The treatment was chiefly eliminative, the purgative at the commencement having a good effect in emptying the bowels. I have described the special symptoms of this case to draw attention to the fact that "louping-ill" may occur in young horses as well as in ruminants.

(2) TOBACCO AS AN INTERNAL MEDICINAL AGENT.

Some time ago I read in one of our periodicals that a decoction of tobacco was used in Ireland with good results in the treatment of chronic diarrhœa in young cattle. As I have had very little success with other drugs used for this disease, I decided to try it. I procured it in powder form (not snuff) from the British Drug Houses, Limited, and prescribed it in powders along with chalk, tannic acid, catechu, gentian, and a condiment. Since using tobacco in this form I have had some good recoveries in cases of chronic diarrhœa in yearling and two-year-old cattle especially.

A considerable number of young Irish cattle are imported into this district annually, and some of these have this disease. It seems to me that this diarrhœa must be parasitic when the tobacco has often such a good effect on it. I have not had an opportunity of ascertaining if any of my cases were those of Johne's disease, but it is scarcely probable that the "drug" would have any effect on that complaint. Formerly I used antiseptics with astringents and sedatives, but a sedative is scarcely necessary when tobacco is used. The tannic acid renders nicotine insoluble, so that there is not much

risk of poisoning when they are dispensed together. I use 5i doses for storks and ʒii doses for two-year-olds, three times each day.

(3) DYSTOKIA.

My attendance was requested to a cow, from which the placental membranes were hanging, but she had not calved. She should have calved in June last, so that she had carried her calf about *five months* past her due time. On examination I found that the presentation was normal, but the head was enlarged and deformed and the whole body of the calf was emphysematous. Cords were attached to the fore legs, but these broke away at the knees, so decayed was the foetus. With considerable difficulty a loop of rope was got over the enlarged head and by this means the calf was pulled away, though considerable force had to be used. The labour pains were very weak, and, when the cow was not interfered with, these were altogether absent.

The case is interesting from the length of time the cow carried the calf. The owner thought that she was not pregnant and was feeding her, and she was already in good condition, even with the decomposing calf in her uterus.

THE USE OF IODINE IN THE TREATMENT OF FOOT CASES.

By G. F. STEEVENSON, M.R.C.V.S.

Lieutenant, A.F.C.

DURING the past four months a large number of foot cases (picked up nails, punctured feet and pus in the foot) from various causes have occurred amongst the horses in the Brigade of Royal Field Artillery in my veterinary charge. All these cases have been treated with iodine (B. P. tincture), and the following is a short account of the treatment, the results obtained, and the principal causes of the injuries.

Causes.—(1) In the great majority of cases the injuries have been punctured feet due to picked up nails, owing to the horses working in places where houses have been demolished by shell fire or other causes, the nails found being in nearly all cases either ordinary wire nails or those used in the roofs of houses. In some cases the foreign body has been detected actually embedded in the substance of the frog or between the frog and the sole, in others nothing has been noticed until the horse has been brought in lame and the foot

examined, and perhaps a large part of the sole found underrun with pus.

(2) A few cases have been due to horses casting a shoe, and through this either being unnoticed at the time by the driver or being some distance from a farrier, the foot being worn excessively low and pus forming in consequence. Injuries from this cause have most frequently occurred in heavy draught horses.

(3) A minority of cases have been due to horses treading upon a cast shoe with the nails remaining in it and pointing upwards.

(4) Laceration of the frog by pieces of glass has occurred in one or two cases.

(5) Pricks in shoeing account for four or five cases.

Treatment.—The following treatment has been adopted in all cases as a routine method:—

(1) Remove the foreign body if one is present.

(2) Give exit to the pus and free drainage ; remove all underrun horn.

(3) Cleanse the part with a piece of clean *dry* cotton wool.

(4) Apply tincture iodine *without* any previous washing.

(5) Cover the part with a lump of clean tow soaked in an antiseptic oily dressing, and after replacing the shoe keep the tow in place by means of two bars of hoop iron placed X wise across the foot and themselves maintained in position by the shoe.

A good recipe for the antiseptic oily dressing is as follows : camphor ʒss, creasote ʒi, ol. tereb. ʒii, ol. arachis Oi, or when this has not been available a 1 per cent. mixture of lysol in the oil used for the guns (Rangoon oil) has been equally successful.

The object of applying the tincture of iodine without any previous washing is that it then penetrates better into the depths and remoter parts of the wound, especially if this be a puncture. If the part be previously washed the interstices of the wound are then filled by the solution used and so the thorough penetration of the iodine is actually prevented. It seems better to remove the whole of the underrun horn, even in cases where this may entail removal of the greater part of the sole, than to trust to the exit of the pus and the penetration of the iodine through a smaller opening, as even when this occurs bits of grit get into the cavity previously occupied by the pus, between the horny and sensitive soles, and may cause the horse to go lame again. Many of the horses treated by this method have had to stand in deep mud, but in no case have there been any untoward effects

ascribable to this. In many cases the horse trots sound on the third day (in slight cases and those found early, sooner than this) and may be put to work, still keeping the bars of hoop iron in position for protection, on the fourth or fifth day.

The following is a summary of the cases treated during the period October 1, 1914, and January 31, 1915 :—

Cases treated, 62, returned to duty, 55; transferred sick, 4; destroyed, 3.

The average duration of treatment for the "cured" cases was 8.04 days, and if five of the worst cases be excluded only 6.4 days. Of the three cases destroyed, necrosis of the os pedis occurred in two, and penetration of the navicular sheath by the nail in the third. Of the four "transferred sick" two were cases of quittor and two were cases in which practically the whole of the sole had to be removed.

CHRONIC LAMENESS AFTER PICKED UP NAILS.

BY PROFESSOR SCHWENDIMANN.

Bern.

AFTER severe injuries from treading on nails, especially when followed by considerable tissue defects, one at times observes, after complete healing and horning over of the wound, lameness persisting for weeks and months or even during life.

This unfortunate result occurs in injuries of the navicular apparatus, of the flexor tendon, of the bursa, and of the coffin bone, but it may be produced also when only the cushion of the frog or the ligaments of the coffin joint are involved. The anatomical causes of the symptom are not always cicatrix contraction and cicatrix pain respectively, yet in most cases it is so. Each condition suffices to bring about this chronic inability, but as a rule it is the product of both factors. Chronic inflammatory processes seldom occur at the navicular bone; cartilaginous degeneration, osteophytic deposits, or more frequently chronic inflammation of the cushion of the frog is suspected if the lameness proves wholly incurable.

The fibro-angioplastic tissue of the granulation is at first very voluminous and its disposal irregular, in keeping with the destroyed tissue tension. Later on it becomes organized, the intermediate substance diminishes, the tissue shrinks and assumes a firm and thick

consistency, later on always becoming harder. Whilst the blood-vessels waste away and disappear through this retraction, this process exercises a painful pressure on the nervous elements of the germ tissue and its neighbourhood (cicatrix neuralgia) which continues at least until investment and accommodation of the part occurs.

Pressure and strain of the body weight in movement are the forces which serve for this appropriate scar tissue investment. The nervous portion of this tissue undergoes a painful dragging which continues until the fibrillæ and nerve bundles have arranged themselves parallel to the pressure and strain.

Finally, the destruction of the elastic tissue which occurs profusely in the injured region plays a significant rôle. The elastic elements only regenerate themselves sparsely in the scar and later on not at all. This has the result that the firm, thick, and unyielding scar causes painful pressure and dragging on the place when the strain of movement and weight of the body acts on it. Diagnosis is easy as soon as we are in a position to bring a reliable anamnesis to the examination, or where the history of the case is known from our own observation. The inability is indicated by a pronounced supporting leg lameness, which is quite marked at the beginning of movement. Severe exertion, however, causes it to become worse. The phalanges are held in volar flexion. Setting foot and standing is accomplished preferably with the wall of the toe. Atrophy of the upper arm or thigh region is regularly present and also more or less diminution in size of the foot. Marked arterial pulsation as well as increased warmth are regularly present in chronic phlegmony of the plantar cushion, and a hard swelling may arise at the bulb of the heel and a deformity of the foot similar to that seen in laminitis.

Prognosis must be cautious in any case and bad in chronic inflammation of the plantar cushion. A careful and suitable treatment of injuries is the principal prophylactic measure. Therapy consists in hot antiseptic foot-baths, poulticing, setoning, and surgical treatment.

Neurectomy may be performed as a final measure and often has good results. Where the horse goes on his toe for a long time a piece of iron, from 3 to 5 cm. long, may be put on to project over the shoe at the toe, and this often has a favourable effect on old lamenesses in a fortnight or three weeks, where work is also properly regulated.

FATAL HÆMORRHAGE INTO THE STOMACH OF AN
AMERICAN BISON.

By GUILL. F. MARAIS, B.A., B.Sc., M.R.C.V.S.
Government Veterinary Surgeon, Pretoria, Transvaal.

Subject.—An American bison, female, about 6 years old.

History.—The animal in question was imported for the Pretoria Zoological Gardens about two years ago. Like the other bisons in the Zoo it developed a cough every year about the same time (during the warm rainy season), from which it had, however, just recovered when it was taken suddenly ill. It gradually became weaker, showing great shivering fits, and died the same morning.

Post-mortem.—On handling the carcase a large amount of blood-stained liquid ran from the mouth and nostrils. As an accident was suspected the base of the skull and spine were thoroughly examined but proved normal.

The fat, flesh, and subcutaneous tissue were also normal.

The lungs showed old lesions of pleurisy, the right lung being attached to the costal pleura.

The liver was very pale in colour and soft in consistence, as also the kidneys.

On examining the interior of the reticulum several blood clots were found and a piece of wire about 2½ in. long, piercing the muscular wall and extending into a fairly large blood-vessel, which showed signs of hæmorrhage.

The rumen also contained a large amount of clotted blood and blood-stained ingesta.

The endocardium of the left ventricle was extensively hyperæmic, especially towards the base, also a few hyperæmic patches were noticed in the right ventricle.

Cause of Death.—Hæmorrhage into the reticulum and rumen.

EXTRACTS FROM THE LETTER OF A VETERINARY
OFFICER ON ACTIVE SERVICE.

SEPTEMBER 10.—I am quite fit and well, in spite of all the trials of war. We are continually on the move, sometimes by day and often by night; we have covered hundreds of miles since we came. It is a terrible thing, this war; I hope and trust I may never see war again after this is over.

It is frightfully hot here in the daytime; it is nice sleeping out at night when it is fine, but we all get covered with bites, which irritate frightfully, from sleeping in the open on corn-fields. France really is a lovely country, most productive; there is corn and fruit everywhere in abundance, and the old farm-houses are simply beautiful. We came along a valley a few days ago, the most lovely scenery I ever saw.

September 13.—We had rather an unpleasant thing yesterday. Captain E—— and I were going along the road where a battle had been fought, and a man came and told us there were four dead English soldiers in a wood, so we took a party and buried them. Captain E—— read the service, and we piled up the grave with stones and put a cross at the head of it. Every wounded soldier I see I feel I should like to hear of the Kaiser's having a bullet put into his body for all this awful misery he has caused. We see lots of German prisoners every day; most of them are very nice men, and any amount of them speak English. They are good-looking, educated young men, and the British Tommy does not bear them the slightest malice.

September 16.—The more I see of this awful war, the more I think the Kaiser wants hanging. By Jove! it would be good for some of those people in England who grumble at every penny they spend which is not for their own luxury to have an invading army through the country, to see whole towns, villages, and beautiful country houses all ransacked and looted by the Germans, as we see passing through here every day. When you thought I was not well I was all right in health, but my spirits were so depressed—it was awful that retreat from the Belgian frontier to thirty miles south of Paris; we were marching day and night, scarcely ever had my clothes off, and sixteen hours in the saddle most days. We often saw a dozen or twenty Uhlans detached from their main body, scouting and watching us from a distance; we never knew which day or night we might not be held up and cut up or captured. Although the army retreated, I believe it was one of the finest things the British Army has ever done, retreating in such splendid order against such enormous odds. I saw my Colonel of the A.V.C. one day, and he said from what he saw every soldier almost must individually have been a hero. I expect you will see by the papers that things are going much better now; in fact, we are advancing every day.

It does seem a pity to see all this beautiful corn standing in the fields and wasting; I suppose there is no one to gather it in. I think I told you before what a beautiful productive country this is.

I think the Germans must be getting more than they bargained for. Now we capture small detachments of prisoners most days which have got separated from their main body, and they talk as though most of their pals were about having enough of it. I don't think they thought England would fight, and now they find she did, I think they find they have tumbled up against something a bit tougher than they expected. . . . The difficulty is getting one's letters posted after they are written, as all the post-offices in villages and towns are closed, and we can only post at a military post-office, which I do not very often come across.

September 18.—It has been very wet these last few days; we get tremendous rain here when it starts, much heavier than in England. It is horrible riding all day in the wet and sleeping out at night afterwards. Thank goodness, we got in an empty house last night and had quite a good night.

It is a dreadful business, this war. Where the Germans have invaded France the villages and towns are deserted, and all the lovely country houses ransacked and looted. English people at home have no idea what war means; to see the thousands of refugees—old men, women, and children—wandering about the country in large wagons is heart-breaking. Our soldiers are having an awfully hard time fighting every day, and yet, when you talk to the wounded, they are all anxious to get back to the Front. Our medical officer took a piece of shell as big as your fist out of a man's back yesterday, and all he said was, "How long shall I be before I can go to the Front again?" Those men are heroes; nothing seems to stop them till they are knocked out altogether.

September 20.—I was in Lagny the day they blew the bridges up over the Marne to check the German advance. By Jove! those were days to think about! I am a long way from there now, close to where the fighting is. In those early days of the war the refugees were the saddest sight I ever saw—they fairly blocked the roads up round Paris. It has been very wet lately; we are sleeping in our valises on the floor in farmhouses now whenever we can, but often under ricks and hedges, or wherever we can get out of the wet.

Thank you so much for the papers. We actually had the luck yesterday to get hold of two papers only three days old—it was a luxury. We have actually been in the same place now for three whole days; we have never stopped more than a few hours before. Will you send me some cigarettes?—but wrap them up somehow to disguise them, as if they are suspected of being cigarettes we shall never get them. I don't think they ever get past the base, as lots of men have never had cigarettes which were sent weeks ago.

If what I hear about the German soldiers is correct, I think the whole lot ought to be exterminated. I have heard awful stories—from good sources, too—which occurred at Château Thierry and Coulommiers. I went and had a look at the battle-

field round Clercy the other day; it was most interesting. We have had a very wet fortnight, but it is a beautiful day to-day. I am feeling as fit as possible. I am simply charmed with this country; it is the most lovely agricultural country in the world I should think.

September 25.—I got your postcard last night, dated September 13, also the dossier for the 8th and 9th. Thank you so much for sending them; we were all pleased to get hold of some news. It looks as if we shall winter here. I shall have plenty of clothes to get through it all right. I have not been inoculated yet, as it is almost impossible to be done on march, as it sometimes makes you feel ill for a day or two. I shall have lots to tell you all when I get home. The more I see of this country the better I like it; it must be a perfect place in peace time. We are having very nice weather again now, but very cold nights. . . . It is funny to see the motor transport, hundreds of cars with the names of English firms one knows so well. I have seen several of Worthington's and the Derby Co-op.

September 27.—We are having an easier time just lately as we are not moving much, things being at a standstill at the Front. We heard the big guns incessantly day and night for the past twelve days.

As the Army moves on it is wonderful how quickly all the refugees come back to their homes; most of them get a rude shock, too, when they do return. It is surprising how clean most of the country people are, and the girls all look so clean and tidy. The living is pretty rough; we live on our rations, bully beef and bread, supplemented by whatever we can buy in the country in the way of milk, eggs, or fresh meat, but, as you may imagine, the Germans have not left much behind, and then there is the Army in front. When you go into a shop when passing through a small town and ask for something, they throw up their hands and say, "*Les Allemands ont tout pris.*" I was talking yesterday to an officer of the Seaforth Highlanders who was wounded and going to the base. He said how happy and well-fed the men are in the fighting line. They get more food than when in barracks, so you can tell this to the soldiers' wives you are looking after—it will perhaps comfort them a bit.

The M.O. and I get on very well together, and have as good a time as possible under the circumstances. If we are not moving on we take rides into the country villages round. There are some beautiful churches in nearly every village. The French villages are most interesting.

September 28.—We have been here (Neuilly St. Front) now four days. The time seems to go very quickly as there is always something to do. I have about 400 horses to look after; the number varies, because sometimes a lot are sent up to the troops with food. The Crown Prince stayed in this village where we are now; the French bayoneted the Germans out. The caretaker of the house we are in had a German officer's helmet, which he gave me. I hope to bring it back as a souvenir. I gave him some tobacco for it.

September 30.—We have had a roughish time up to now, but things are settling down a bit, and we are getting into our stride again. You hear some funny tales out here from some of the men when they come out of the firing line, but, after all, some strange things do happen, and the Tommy at war is a great, good sport, and a hero on to that. I will tell you a thing which happened a day or two ago—the medical officer who saw it told me. He was proceeding with a supply column, and a shell dropped on two horses and wiped them clean out of existence, and, of course, they made sure the driver was killed. He was smothered in blood, but bar being petrified with fright he hadn't a scratch on him. I myself saw a funny thing. We were fetching some gun limbers in which had been abandoned by the Germans in their retreat, and on the seat of one where a man had sat was left a mass of pulp and blood and scraps of a German uniform, but the limber had only got a bit knocked off the back. Well, we had some stirring times in that retreat from the Belgian frontier to south of Paris. We were in hourly danger of being scuppered or taken prisoners; it was not pleasant, I can assure you. It gave you that sort of feeling I used to have when I was a youth and going in for a boxing bout or a very unpleasant Rugger match. You know the feeling, and when you get at your work it is all right. Well, we had the feeling all the time without having the work—not that I was anxious for the fight. I can imagine exactly how the Tommy feels. It is the suspension which hurts, and when he gets busy at his job he forgets all in the excitement of his work. The most exciting time was at Lagny. We were the last convoy to cross the Marne, and I was in the rear and five more. After we crossed up went the bridges. By Jove! what a noise! Talking about Tommies, they are funny. One day on our retreat we expected to be attacked every minute and formed the wagons into a square, with the men around lying all round the wagons. It was a very hot day, and I saw our mess cooks under a wagon both fast asleep and snoring like pigs. They had both been in South Africa and seen some fighting, but I thought it just about took the cake.

I am afraid we look like being here all winter. If the British mean going to Berlin there will be some fighting yet. I think one good thing about this war; all the British troops seem in excellent spirits up to now; you hear very little grumbling from the men who come down from the front. (Letter to Mr. Fergusson.)

October 2.—We are still hanging about the same place, some days just moving a few miles. We are sleeping indoors in our valises on the floor; it is quite comfortable. We are having very cold nights and beautiful hot days. I expect the troops at the front are feeling these very cold nights, but I should think from all accounts they are as happy as possible under the circumstances. I expect our hardships will start again when the Germans retreat and we have to go over the country they have been fighting in.

I did not see Père Gigot. I did not have time to go, as he lived two miles outside Dammerten. It was lucky I did not go to see him, as that was the day we had to scuttle out of our camp with the Uhlans at our heels. I see there are only about four Territorial A.V.C. officers out here, so I suppose we ought to consider our selection an honour.

I got that bundle of papers last night; they were most acceptable. We never see a paper unless it is a week old. Most of the places we read about we have seen, and also plenty of the photos in the illustrateds are quite familiar. I read an article in one or two of the papers about the refugees returning to their homes. It was true in every detail; we see such scenes nearly every day.

October 5.—We are moving off to-day, and then, I think, we are entraining, so you need not be surprised if you do not hear from me for some time, as we shall be out of touch with the post. I do not know where we are going, but it may be north of where we were when we started that retreat.

Isn't the list of killed awful! But I believe the Germans' is something terrific—all the prisoners seem to say so. Most of the stories of the horrors committed by the Germans are true, as I have seen any amount of it myself.

October 12.—I have had rather a strenuous time lately. We were just behind the Aisne, where we moved by several long marches, and then we entrained for several hours, and we hope, if things go right, to be soon further on into the country that has received such an awful time. It is quite strange to be in a country where there has been no fighting. I do not know anything about how the war is going elsewhere, but I hope they are advancing in the centre or the east. I got the two batches of papers. I do so enjoy reading the *Times*, and the *Mirrors* and *Sketches* are very popular with us. I am just going into A—— to take some sick horses.

October 17.—I am looking forward every day to getting some more letters from you all. We have been moving about a good deal lately, so have not been able to get letters. I am a long way from a military post-office, so don't know when this will be posted, but I hope you will get it soon. The part of the country we are in now has not been overrun by the Germans, so that there is nothing particularly exciting in trekking along. It is a very nice country, exactly like that from Calais to Paris. We have not heard much the last day or two how the war is going. I was sorry to see Antwerp has gone. We can only hear the guns from here indistinctly, so that we are probably twenty-five miles from the fighting. I expect we shall keep moving up. I shall never forget the din of artillery at the battle of the Aisne—it hardly ever ceased for about a month while we were there.

We have plenty of Rugby footballers here. The M.O. in the other park plays for the Army, and also played last year for Ireland. We also have a lieutenant who plays for the Harlequins. I shall have to ask them down next winter, and get them to play in a match or two for Burton.

I have been very busy just lately—influenza has broken out amongst the horses. I have had to send fifty-four away the last few days. I think we shall soon be rid of it now. We stayed in a big farmhouse last night, and may be here again to-night. It is a funny thing, but none of these French houses have baths. I have only been able to have one bath since leaving England, and that was in a soft water tub under a spout in a disused brick-yard. I should love to get into a good bath and get into civilian clothes; it will be a treat when it does come.

We take all our food with us on a mess wagon. If we billet at a place for the night we do not have any food with them, only sleep. They often find us a room to have food in, which is cooked by the mess cook outside. If there is no room we have it in the open or under a shed; it is pretty rough cooking, but you are ready to tackle anything.

October 19.—I have had a whole budget of letters from you yesterday, also the parcel containing all the things you sent, which were simply lovely.

Tell the people who are anxious about the horses that we are well supplied with all necessities by the A.V.C., and the horses want for nothing at present. Of course, it is no picnic for them any more than it is for anyone else, and sometimes they have had to work when they should not; but this is war, and the Germans don't wait till your horses get well. There is a great amount of supervision over the horses, and cruelty is reduced to a minimum, considering all things. Of course, any hopeless cases are at once destroyed. It is the men in the firing line who need all the comforts they can get. They must get terribly cold at night in the trenches, but, as I told you before, they are splendidly fed, which goes a great way to keeping a man warm.

A great friend of our M.O. was killed some little time ago. Two days before he was killed he was recommended for the V.C. Wasn't it rough on the poor chap? The R.A.M.C. have had a very thick time of it. A man named C——, another friend of the M.O.'s, was crossing to a trench to see a wounded man when he was struck by a high explosive shell, and there was not a vestige of him left. Isn't it awful to be clean wiped out like that! We are getting a bit nearer the fighting; we can hear heavy firing to-day. I do hope our troops will soon be able to push those brutes out of Belgium. I hope there will be no more retreating for us. I have not yet seen the Indians; they are coming up into action some time this week, I believe. I hope those little Gurkhas will give them a taste of what they have been giving the non-combatant population. The Germans must be brought to their knees, if it takes years to do it. They, on the whole, are not better than swine.

I think one of the most exciting experiences I had was at S——. In the middle of the night we heard some rifle shots quite close. It appears that some straggling Germans hidden in a wood had fired at one of our sentries; then our men began to fire.

I—— and I rushed out in the dark, and there was a perfect fusillade for some minutes; you could hear the bullets whistling in the dark. We expected one every minute. It is a nasty feeling in the dark. I thought at least we were surrounded and our turn had come. However, it all came out right, and the only damage was a man shot in the leg. In the country we are in now you would think there was no war going on if it were not for the refugees coming away from the fighting district, and the sound of the cannon booming away as I write. I hope the beastly Germans will not get here. I should hate to think of them laying waste this beautiful country and sacking all the nice houses.

I do so enjoy the newspapers you send, especially the *Times*. The *Daily Sketch* sent our men 10,000 cigarettes yesterday. Isn't it good of them? I hope they will be thanked.

October 22.—The country round here looks beautiful, the leaves are just turning, and it is simply lovely. I don't think I told you I have been through the forest of Compiègne twice, once when we were retreating, and then on our upward move. It is the most lovely place I was ever in. There are beautiful roads through it, and the trees are most majestic. Practically the whole of the German Army came through the main road on their way to Paris. As we came back through the forest we camped one night in the middle of it. Large and I slept in our valises under an immense tree just off the road. The stillness in the night was most weird, only broken by the screeching of owls and the distant boom of cannon north of Compiègne.

Compiègne is a lovely place, and the Germans have not knocked it about much; our people blew up a lovely bridge there. As you enter from the north there is a big palace built by Napoleon.

The *Times* is most acceptable, as it always gives such clear accounts of everything. Can you post one or two as soon as you finish with them? Everyone also likes to see the *Sketch* and *Mirror*, and they are nice for the men. I don't think they will use the Territorial artillery out here at present; they say it would be like murder, as these Germans are so deadly in their aim with artillery. I do hope we shall soon be able to cricket them out of Belgium, so that the fighting can take place in Germany, and then we shall see how they like war in their country. I personally think as soon as we begin to fight in Germany they will want peace at any price; so long as their own country is not devastated they don't mind.

We are having now about the quickest and slowest time since we came into the country. We have billets in a large farmhouse. I wish they could get the blighters out of Lille, then I expect we should soon slip on.

October 25.—I wish people could see what I have seen here these last few days, refugees pouring through, not by hundreds, but thousands. God above knows where the poor beggars go and what they live on. They are all old men, women, and

children of all ages; scores of the women are expecting to become mothers. I saw one woman who had seventeen children with her, and she told me they were all her own, and her husband was fighting *à la guerre*. When the men on the convoys give them some of their food the children eat it like wolves. If anyone can see such a sight and not want to fight he is not worth the name of man. I think we must be on the eve of great events at the Front. I do hope it will all be successful. Everyone seems very satisfied with the way things are going, so I hope we shall have no set-backs. When we were billeted at Sarcy for one night some time back I slept on a floor in a house the Germans had been in for four or five days. I found about half a dozen postcards in German. I got them translated. They were all writing to their friends in Germany, and every postcard began "We are now in Paris," and one blighter went so far as to say he was encamped under the Eiffel Tower, and they all said what a lovely place Paris was! They had evidently got them written ready to post as soon as they reached Paris. There is no doubt they were cocksure of getting there. I lent the cards to an officer in the motor transport, and he promised to return them, but has not done so yet.

November 2.—We have been here, F——, since Friday last. We keep creeping slowly northwards. This is rather a larger town. We have our mess at a sort of girls' high school; the headmistress invited us. The M.O. and I sleep at the senator's house; it is lovely to be in a bed again. It is one of those big old-fashioned houses in the middle of the town facing up to the street.

There is some heavy fighting going on. I do hope we beat them back, as it would be cruel to have to retire again. I should think it is a very crucial time for both sides just now, but we must hope for the best. I think our men in the trenches must be fighting like heroes. I think the Germans, sooner than have the French, Belgians, and Russians over their own land and homes, will accept almost any terms of peace. If the French and Belgians once get into Germany, I am afraid there will be some frightful havoc; they are sure to get out of hand after all they have suffered in their own homes. You can tell what they feel like when talking to them—it is rage smouldering, and when it breaks out I think it would be awful.

We get very good bacon issued to us for breakfast. Yesterday we had bully for lunch and curried bully for dinner. I expect it will be Irish stew bully for dinner to-night. The bully beef is very good; no one need grumble as long as they get plenty of that and bread and cheese. We drink a big lot of tea; we have it at every meal; it also is a Government issue.

November 5.—We are still in the same place. I don't think we shall move far until they can get a good move on. The fighting at the Front is terrific. I am glad the first Territorial lot to go into action did so well. I believe they covered themselves with glory against some of the Kaiser's picked troops. I believe

their losses were 300 killed, wounded, and missing, which is comparatively very small considering what they did. I wish we had got about another half million good men to put in the field against those blighters, and I think that would soon make short work of the war; any way, so far as Belgium is concerned.

The ladies at the school we are staying at are teaching our cook some French cooking, so we are doing very well now in the way of feeding. It is all right here, but I shall be glad when we get a move on, as the sooner we get going the sooner we shall be home. The other day I was riding along the road with Captain E—— just at dusk, and a small farmer came out on the roadside and said two Germans were behind his house. E—— jumped off his horse and chucked the reins to me, and was after them like a shot. They bolted into a wood close by, and he went after them; then I heard a revolver shot, but after about five minutes I was glad to see him come back. He had fired at their legs, but missed them, so had to give up the chase. It takes a bit of pluck to rush into a wood like he did. It all happened before I knew what he was up to. He simply chucked the reins to me, never said a word, and bolted for them like a greyhound. This was some weeks ago when we were coming from the Marne.

November 10.—A funny thing happened here the other day. I met a Frenchman in the street, and he said, "I know you," and I knew his face. He was a refugee from Lille. He was a horse-dealer there, and he had met me at Crewe and Derby. He is hoping to get back in a few days.

November 15.—The 8th Division are not far from here; all their motor transport has been coming through this town most of the week. There is not much news, as most days are spent in the same way—getting ready and keeping fit for the next big move. I shall be glad to get the pipes and tobacco, although we get a ration issue of tobacco each week. We can get matches now all right, but later on I should like you to send me some safety boxes. Many of the men, I am sure, are living better than when they are at home, and they have just had issued to them new socks and shirts, and new khaki and boots. It is the poor beggars who are actually in the trenches who want all the comforts, &c., they can have.

November 16.—I wish we could get a move on. The time goes rather slowly here, and one feels we are doing nothing, while the men in the trenches are having such a frightful time.

I saw that article about the war lasting three years. Neither side could possibly stand it at the present rate of losses. I think about another six months and the Germans will have had enough. I cannot see how their resources can possibly hold out longer, attacked as they are from both sides.

There are a great many dreadful tales with regard to the treatment of the French and Belgians; some, no doubt, are true, and some, I expect, are very much exaggerated: and yet, if they (the Germans) will do the things which have been told to me by

people who were present, then I should say they are capable of committing excesses which would make animals and savages blush. At Bettissy St. Pierre a tradesman in the village told me that when the Germans came through with their army (it took them ten days going through on their way to Paris—there were over 200,000 men on that route alone) they had in front of the troops marching twenty-five civilians (old men, women, and children); one woman in the street just below the house we were then sitting in was in front of the troops, and was leading two children, one by each hand, their ages about 6 and 8. The woman was shot clean through the stomach, and she lived a day or two, and the children are now motherless. Also, they ravished every young girl in the place, and some of them died or were killed. At Château Thierry these "gentlemen of Kultur" did things . . . which sound impossible, but the French people who told us, I should think, were telling the truth, by the frightfully sad and dejected manner in which they spoke. Can it be true? And yet these people seem quite genuine. I hope there will be an inquiry after the war, and if they are true the Germans must always stink wherever white men live.

I think that note which Lord Kitchener issued to the troops before leaving England did a lot of good. I must say I have never seen anything but the most courteous conduct by any of our men both to women and children.

November 25.—I am afraid I shall not get your letters so regularly now, as the motor-lorry which has been coming out here every day is only coming twice a week now, so that we can only receive or send letters twice a week instead of every day as we have been able to do this last three weeks. It snowed all day yesterday; there is about 3 in. of snow on the ground, and there were 10 degrees of frost last night, so you can imagine what the roads are like. It is a beautiful, sunny, frosty day to-day, so one does not feel the cold a bit. It is awful to think of the poor beggars in the trenches and doing outpost duty on a night like last night. Even yesterday, although it snowed hard all day, the boom of cannon went on incessantly.

The other park that was stationed here with us has been moved eight miles away, because two new parks of Kitchener's Army have come out from England, and one has had to come here under our major, and the other under the major of the other park, as the new parks are fresh to the work and have to be under the wing of one that knows its job well. The reason the other park had to move from here was because there is not room in a small town for more than two parks, and we eat all the fodder and drink their water dry—over 700 horses and wagons take up an awful lot of room. One park on the march stretched for nearly a mile on the road. One feels quite an old campaigner when these new fellows came out; they will never see what we saw, nor, I hope, will ever know what a retreat is like. I hope I shall never have such an experience again. We sometimes come across some of the troops that had been fighting and had

got separated from their units. They looked awful—footsore, unshaven, hungry, and thirsty, and had a hunted look about their eyes you could never forget when you had once seen it. I shall never forget coming across about thirty of the West Kents; they had been travelling two days and two nights without food or rest; they looked awful; but when I come home I will tell you one or two most magnificent actions those men did one for the other. I don't think people realize how near the British force was to being wiped out in those last days of August.

My friend ——— here has opened my eyes for me. I shall be able to tell you all about the first days of the war when we meet.

Translation.

WOUNDS IN GERMAN ARMY HORSES.

By EBERLEIN.

THESE have been very frequent. Large wounds have been sutured, contused ones regulated and treated as open lesions. Eberlein praises the mechanical disinfection procedure used by him for some years, which consists in having the wounds carefully rubbed dry, freed from hairs and painted with dilute tincture of iodine or mastisol, and covered with a tampon. Never was washing or syringing out of wounds performed even, although they were soiled. Healing and recovery were remarkable, and in this connection mastisol showed itself superior to tincture of iodine. Very purulent superficial wounds and ichorous and necrotic wounds were successfully dealt with by the use of lenicet (a preparation of aluminium sulphate), lenicet talc. and iodine, and lenicet powder. Pyoktanin has also been largely used. On injuries due to blows in the region of the tibia, radius, and joints, mastisol painted on has produced good results.

Saddle and harness sores were very frequently the result of new and badly fitting gears, too small collars, and great leanness of the neck and back as a result of severe exertion. Also remaining harnessed all day long and faulty skin hygiene helped their occurrence.

Since the animals, in spite of watchful and timely treatment, owing to the quick travelling of the troops could not be spared, the severest necrotic processes were met with on the fascia, the neck ligaments, the spines of the vertebræ, and even the shoulder-blade. Nevertheless, septicæmia seldom occurred, and slaughter was only necessary in isolated cases. Cases of traumatic laminitis were very numerous and caused by over exertion (long, continuous marching, ordnance, and patrol rides), and they were often accompanied by symptoms of colic. Timely copious bleeding and injection of arecolin had good effects. Unfavourable complications were rotation of the os pedis and necrosis of the sensitive foot.

Suppurative and gangrenous pododermatitis occurred in a few

cases, chiefly as a result of bullets, treads, and picked up nails, as well as laminitis, and three cases of fistula of the lateral cartilage.

Treads, and wounds from picked up nails after being opened up, were treated by painting with mastisol or tincture of iodine, and a twill plaster put on. Despite deep nail penetration, healing without pus formation took place in ten days. A severe injury of the flexor pedis perforans healed when treated thus quite unexpectedly. A horse with a perforating wound of the fetlock joint, and another with a wound of the flexor pedis perforatus, were also healed with mastisol.

Injuries from infantry shots were very numerous, and were treated favourably with mastisol and tincture of iodine. Unnecessary palpating, exploring, and washing were never undertaken.

Remarkable effects were caused by aerial bombs. Even small pieces of the bomb caused severe wounds. Three soldiers and seven horses of an ammunition column were killed by a single bomb. Although striking the earth 100 metres away fatal results to men have been noticed.

Injuries from aerial darts were not numerous, but very severe when they occurred. In one case a dart went through the pommel of the saddle and a ninefold thick saddlecloth and into the muscular tissue of the shoulder.

As regards shoeing, shoes lasted on an average four weeks. The supply of shoeing iron was scarce, and substitutes had to be provided. The shoeing-smiths were insufficient in number and badly organized.—*Swiss Journal of Veterinary Medicine*.

G. M.

Reviews.

Text-book of General Therapeutics for Veterinarians. By E. Fröhner, Professor of Pathology and Therapeutics, Berlin. Translated by Louis A. Klein, Professor of Pharmacology and Veterinary Hygiene, University of Pennsylvania, and Dean of the Faculty. Published by J. B. Lippincott Co., Philadelphia and London. Price 12s. 6d. net.

This book has gone into its fourth edition. It forms good reading, and is one of the few publications that makes the science of therapeutics interesting to the reader. It is up to date. Protective vaccination, which has developed so much in the last decade, is concisely and adequately discussed and explained. The general therapeutics applicable to the various parts of the body is indicated, and the oral and subcutaneous methods of using drugs and their doses are given. The German regulations governing disinfection have been included in the translation and are instructive and applicable to a large extent here.

In the descriptions of the therapeutic uses of the individual drugs the names used in the U.S.A. Pharmacopœia and in the U.S.A. Dispensatory have been employed. Air, water, and

massage are discussed as remedies in disease, and the author acknowledges his indebtedness to human medicine for many of the methods he advocates. The work is well indexed, and comprises 296 pages of letterpress. The translation is a good one, and any veterinary surgeon who takes a special interest in therapeutics may obtain much valuable information from a perusal of the volume. By reason of the way the book has been compiled students, too, can peruse it with pleasure and profit.

G. M.

The Journal of the Board of Agriculture for February, 1916.
Price 4d. monthly.

This periodical, among other interesting matter, contains three articles of outstanding merit, namely: "The Cultivation of Sugar Beet in Norfolk and Suffolk," by C. S. Owen, M.A., and J. Orr, M.A.; "Flax Growing," and "Manufacture of Charcoal." Some valuable information is given on "the growing of spring wheat," which, considering the great amount of wet weather we have had, and the urgency of the matter of increasing the wheat area, is particularly appropriate. The value of soot as manure and to improve the warmth or texture of soils is indicated in a short note on the subject. Other articles in the journal are those on "The Cultivation of Chicory" and "Coco-nut Cake and Palm-nut Kernel Cake." This month's number well maintains the standard of merit observable in the literary department of the Board of Agriculture.

G. M.

Text-book of Milk Hygiene. By Dr. William Ernst, Official Veterinarian and Director of the Royal Milk Control Station at Munich. Translated by Dr. John R. Mohler, A.M., V.M.D., and Dr. Adolph Eichhorn, D.V.S. With Appendix containing laws regulating the Production and Sale of Milk in the British Isles, by G. Mayall, M.R.C.V.S. Publishers: Messrs. Baillière, Tindall and Cox, 8, Henrietta Street, Covent Garden. Seven coloured plates and 29 figures. Price 15s. net.

The importance attached to a clean milk and the danger of its contamination at its source, during transit, or before it reaches the consumer's mouth, render a book devoted solely to the *tout ensemble* of the obtaining of a pure supply very valuable. In order to be a competent adviser in the matter the veterinary surgeon and the sanitary expert must have an intimate knowledge of milk, its formation, procurement and characteristics and any conditions which change it in the animal body or after it has been obtained. This volume leaves no gap in the circle or field of knowledge surrounding the subject.

The anatomy, pathology and histology of the mammary gland, the physiology of lactation, the microscopy, composition, biology, chemical and physical characteristics of the lacteal fluid are all fully discussed. The proper hygiene attached to the procurement of a clean supply of milk, and the internal and external influences that act upon the lacteal fluid, are adequately dealt with.

Chapters on the bacteria in market milk, milk control and milk inspection, follow, and the work is completed by an appendix on the laws regulating the production and sale of milk in the British Isles, by G. Mayall, M.R.C.V.S. Municipal veterinary surgeons especially will find in the book a guide and friend. It is essentially a veterinary surgeon's manual, and the author's intention in writing the book is well indicated in the following words: "In the field of production veterinarians are the proper experts, who must stand by the side of the producers and give them the necessary advice and instruction. Only by the active and expert aid of veterinarians can it be hoped to improve the goodwill of the producers."

The get up and printing of the text-book are excellent, and the illustrations are splendid.

In connection with the question of over-stocking it is interesting to note that—"The nerves of the udder originate from the lumbar plexus. The udder is supplied by the internal branch of the ileo-hypogastric nerve, the external branch of the lumbo-inguinal nerve and the external spermatic nerve."

Diseases of Swine. With particular reference to Hog Cholera. By Charles F. Lynch, M.D., D.V.S., of Terre Haute Veterinary College, Indiana. Octavo, pp. 741, with 120 illustrations. Cloth 21s. net. Publishers: W. B. Saunders Co., 9, Henrietta Street, Covent Garden, London, W.C.

This is the largest volume on the subject that we have yet seen produced either in this or any other country. The work commences with an interesting description of the breeds of pigs met with in America. Its chief value undoubtedly depends on the masterly exposition given of the history, distribution, occurrence, prevention and combating of hog cholera. Just over 400 pages are devoted to a consideration of the disease. The cause of cholera and the danger of infection from the animal emanations are lucidly set forth. In connection with the vitality of the virus it may be noted that the author states that hog cholera pens may remain dangerous for at least a year after the occurrence of the last case of the disease therein, but proper hygienic measures conducted after an outbreak tend to shorten this period. Cases are quoted to show that the virus is not destroyed by the freezing weather in Iowa in the winter months, and especially not so if protected by a thick layer of mud and refuse. Repeated disinfection, fresh earthing of the pens, and burning all refuse are safeguards not lightly to be omitted. A solution made of 50 gallons of water, 1 gallon of crude carbolic acid and 5 lb. of laundry soap is recommended as a spray for disinfecting pens and chloride of lime is stated to be the best floor disinfectant.

The predisposing causes of swine fever are connected with age, sex, pregnancy, breed, geographic location, feed lots, water supply, unbalanced rations, &c. The danger of infection from kitchen, restaurant, and hotel refuse is indicated; so important is this matter considered that in Canada no compensation is allowed for pigs slaughtered by inspectors' orders, where it is found that the owner has been feeding hotel or kitchen refuse.

The proper way to dispose of dead animals is to burn them. This is especially important in a country where animal scavengers and beasts of prey abound. The danger of leaving carcasses about on the farm is specially indicated from the fact that virus carriers, like buzzards and crows, will often come from as far as 100 miles to feast on an exposed animal carcase. Chicken cholera is said to be frequently the precursor of hog cholera and an outbreak of the latter is ascribed to the throwing out of dead fowls into the field or along the hedge fence, to be eaten by other animals. Dogs also assist in spreading infection and Dr. Lynch asserts that he has frequently encountered dogs crossing the road from an infected pasture with a bone or other remains of some dead cholera animal, and invariably he could count on receiving after a few days a notice of cholera on the farm which was the home of the dog.

Rules for making *post-mortem* examinations, lesions found, and incubation period of the disease are all fully discussed. The turkey egg spotting of the kidney seems to be an almost constant lesion of hog cholera in America. Types of cholera, symptoms and diagnosis are well described and full instructions as to treatment of the complaint by means of serum follow. Serum when used alone confers protection for about six weeks. *The double method of treatment by serum and virus blood bestows immunity for life.* In the hands of a competent man it is just as safe as the single treatment. Clinical evidence of the value of the procedure is proved by the relation of the effects of inoculation in forty-seven herds and shortly the author declares that "the injection of a double dose of serum and virus not only will not produce the disease, but it will result in the development of a permanent protective power against invasion by cholera germs."

The other diseases of swine (infective and general) are discussed in 212 pages of the book. It is news to us to learn that swine erysipelas is not seen in hogs in the U.S.A., and swine plague, too, is said to be absent. Tuberculosis in swine is concisely and knowingly dealt with. The intradermal test for tuberculosis is something new. It consists in shaving the hair off a small area on the skin and injecting a drop or two of the test-fluid between the layers of skin, *not under the skin.* The animal is then left undisturbed for 12 to 24 hours and the spot then examined. If a positive reaction occurs the area round the point of injection will be found to be reddened and inflamed. If no tuberculosis the spot will be natural in colour. Pages amounting to 132 on the diseases of the digestive and respiratory tracts, kidney, bladder, heart, skin, nervous system, organs of locomotion and generation, parasitic and surgical diseases follow and the volume concludes with articles on castration and spaying of porcines, by Dr. George R. White. In reference to the treatment of some of the general diseases of swine the author seems to have a noticeable fondness for the use of castor oil and calomel, and to recommend them rather indiscriminately. We fail to see any special virtue in repeated doses of castor oil to swine with pneumonia and have always had fair results with medicine such as sodium hyposulphite, pot. nit., Glauber's salts, that can be given, and will be taken naturally in milk. Again, in cases of pneumonia, stimulation of the

sides is valuable, but is not mentioned, and instead of "putting a blanket over a sick animal" (which is likely to stop on effectively for about three minutes) we prefer, and have had success from cutting two holes in a piece of old blanket or horse-rug, putting the pig's forelegs through it and stitching it (so that it comes up to the chest) along the withers and back, covering the chest region and so making a jacket for the patient. The steaming of pigs' nasal organs for catarrh by means of medicated inhalations is a measure likely to be very indifferently carried out, and unless labour is plentiful, very impracticable. Good enough results will be brought about by pure air, warmth, warm food, and the use of the remedy that has gained a big reputation in these cases, viz., a mixture composed by weight of 1 part of ammonium chloride, $1\frac{1}{2}$ parts of liquorice powder, and 2 parts of sodium sulphate. Dose, a teaspoonful to a dessertspoonful two or three times daily, well mixed with the food. In diarrhoea in pigs, calomel followed by castor oil is worse than useless, in our opinion. We prefer a mixture of bismuth and salol, and commence giving it at once, especially in young pigs.

The author does not touch on the causes of fully developed dead-born progeny, or give his reasons for sows eating their young, or any measures to check the evil habit. We should have liked to read his opinions on these all-too-frequent troubles. In discussing the surgical measures for prolapse of the rectum no instructions are given as to its amputation. In over 90 per cent. of cases of prolapse we have attended, amputation has always been necessary.

The book is well illustrated and bound. As regards the infectious diseases of swine it marks a great advance on anything hitherto written in the Anglo-Saxon tongue. If the author's statements with regard to the use and value of protective inoculation in hog cholera are at variance with the authoritative pronouncements given in this country as to the effect of the treatment in America, yet one cannot disregard the fact that they are the favourable opinions of a capable American veterinary surgeon given after sifting, weighing, and estimating the evidence for the use of inoculation, and after large and extensive practical experience in the technical detail of the subject.

G. M.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably type-written—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.



THE LATE MR. SIDNEY SMITH, M.R.C.V.S.

THE VETERINARY JOURNAL

APRIL, 1915.

THE LATE MR. SIDNEY SMITH, M.R.C.V.S.

THE news of the passing of our colleague, the late Mr. Sidney Smith, M.R.C.V.S., will have been received with very general regret throughout the veterinary profession, and beyond the limits of the profession, of which he was a zealous and a loyal member. Born at Halesworth, in Suffolk, so long ago as 1847, Sidney Smith qualified in London in 1869, and in the following year—that of the Franco-German War—he commenced practice at Lowestoft. Always keen on the better organization of his profession, he was one of the earliest members of the Eastern Counties Veterinary Medical Society, of which Association he subsequently was elected President. A frequent attendant at the meetings of the Society, his contributions to the discussions were characterized by sound practical common sense and a very catholic knowledge of veterinary science. Nor were his professional interests limited to his own local Association—he was also a member of the National Veterinary Medical Association for several years and showed his interest in its progress in various ways, including attendance at its Congresses at Yarmouth, Brighton, London, and elsewhere.

As we have indicated above, Sidney Smith's interests were not limited to the profession of which he was a distinguished member; he recognized the truth of the well-worn adage that "He who knows only his own side of the question knows very little of that." In accordance with these governing ideas of a long and useful life, he was not only an active member of his profession, but a loyal and public-spirited citizen.

On the formation of the Suffolk Hussars he joined that admirable corps, eventually retiring with the rank of sergeant-

major. He took a keen interest, moreover, in agriculture, and early in life he purchased a farm at Pakefield, just outside Lowestoft, and carried it on successfully up to the date of his death. Mr. Smith followed local civic affairs keenly, and was Chairman of the Pakefield Parish Council, and also one of the School Managers. He acted as Veterinary Referee to various agricultural associations for many years, and was also an occasional exhibitor at the annual shows, besides holding official appointments under the Contagious Diseases of Animals Act from the Lowestoft Town Council and the East Suffolk County Council.

In private life Sidney Smith was a thoroughly popular and genial companion with a keen sense of humour, and an excellent sportsman. He married in 1885, and leaves a widow and three sons, the eldest of whom, Major Sidney Smith, R.F.A. (T), is now attached in the Royal Flying Corps. His second son is an estate agent in Australia, and his youngest son is also serving his country as a corporal in the Army Service Corps.

To the widow and family we address, on behalf of the profession, this expression of our condolences in their great loss.

ROYAL COLLEGE OF VETERINARY SURGEONS.

SPECIAL EXAMINATION.

At a meeting of the Board of Examiners held in London on March 23 for the Written, and on March 24 and 25 for the Oral and Practical Examination, the following gentlemen passed their Final Examination:—

Mr. J. Campbell, Mr. W. G. Clarke, Mr. S. Flood, Mr. L. Herbert (Royal Veterinary College of Ireland, Dublin); Mr. L. Anderson (Royal (Dick) Veterinary College, Edinburgh); Mr. G. B. Cooper (Veterinary College, Glasgow); Mr. J. W. Beaumont, Mr. L. D. D. Sewell, Mr. R. T. Smith, Mr. H. B. Williams (Royal Veterinary College, London).

Editorial.

THE IGNORING OF THE VETERINARY PROFESSION.

Not once, but probably a dozen times in the last twenty years has the veterinary profession had the go-by given to it in domains in which it ought to have reigned supreme. We seem to remember Orders promulgated, prominent official positions given, Commissions appointed, laws drawn up in connection with veterinary matters ignoring the profession entirely or putting it under the thumb of men whose technical knowledge has been about equal to their inherent sense of modesty. Both have been remarkable by their absence, and the valuable results obtained for much misapplied effort expended have been consequently small or non-existent. Then it has been said what little progress the veterinary profession has made, how lethargic it is, and how many important scientific matters in connection with contagious and infectious diseases of animals remain in the elementary stage. In some cases protests have been made at the small or wrong representation of our body on committees of inquiry, and sops have been given to weak Cerebuses by the powers that be. Perhaps no scientific body of men have been so frequently or persistently ignored as our own, but in this country in other matters there have been many instances of square pegs trying to fill round holes. No doubt this accounts for us being a long way behind other countries in matters of research and science. When important military supply affairs get into a muddle business men are asked for, when really what is wanted are scientific experts with organizing and administrative ability. D.D.'s are not the right men to conduct inquiries into pleuro-pneumonia, D.C.L.'s to investigate the uses of radium, nor M.D.'s to conduct research in swine fever, but under present happy-go-lucky-bag methods and provided they possess a sufficiently just sense of the unfitness of things, they stand a very good chance of arriving at the long job with the plentiful emolument.

How do these incongruous things arise? Is it not really because those with the most influence with the politicians get their own way? Those with the most wealth, or social influence behind them as a profession or trade union; those who hold the politicians' future in their hands by voting power; these are the

ones that get the soft jobs. There is another class that sometimes succeeds in a measure in a subordinate yet lucrative position by means of sycophancy and lickspittleism, but these are not arts which any self-respecting independent body of men will care to practise. The whole position of our profession, judging from past and present Governmental methods, is likely we fear to remain obscure for some time. When our Bill becomes an Act things may improve under wise direction and application, but we always stand to have our dearest principles and traditions trampled on until we take up adequate measures for defence and advancement.

These thoughts have been summoned to mind by a contemplation of the list of members appointed by the Royal Society to conduct research into swine fever.

Whether the Royal College of Veterinary Surgeons can bring sufficient weight to bear to remedy or alter the list remains to be seen, but we think the true reasons for our passing by are hinted at or indicated in this editorial, and the procedure in the future will not be easy to remedy until we are strong enough politically to fight for our own hand.

G. M.

SOME THOUGHTS ON LIGHT HORSE BREEDING.

AN old Lancashire cotton spinner, whose son showed more inclination for totting up figures in the office than looking after technical matters in the mill, is reported to have said to him one day: "You'll need no books, John, if you don't look after the mill." The old man was shrewd, and had a just appreciation of the importance of a due sense of proportion between manufacturing operations and an estimation of their reward. We sometimes wonder whether a proper sense of the comparative relation between horse breeding and horse buying is ever considered by our authorities. It is certain that in the future "we shall need no cavalry if we do not look after horse breeding." In this matter of breeding animals and buying them a lack of a sense of proportion often seems to exist. It does not apply solely to horse matters. But there appears at times to be a sort of generally prevalent imagination that horses grow on trees, cows arise from buttercups and daisies, and pigs are regularly plentiful when spring showers come. At any rate, those who want horses,

who need cows, and who solely feed pigs for pork and bacon are always more plentiful than those who produce them. The minds of the requirers never dwell on a consideration of how the subjects wanted are produced. Those who are determined and set on getting the animals are an infinitely greater crowd than those who work, trouble, and exercise their faculties in the breeding of them. If everybody wanted animals and nobody produced them stoppage would result. Fortunately, there are always some people ready to take the position of bottom dog. The worst of the matter is that if there is any spare kudos knocking about or any special material gain to be obtained, the pocket of the man or body that exercises the superficial qualities of the commercial traveller always benefits unduly. Instead of the major portion of the gain going into the hands of the breeders it passes into the purse of the middleman or the buyer. This is not as it should be in a country with which all is well.

Any special encouragement given should be exercised in favour of the producer rather than towards the distributor and buyer. When the last are in infinitely greater force than the first, the need of fostering and furthering the interests of the producers becomes far more necessary and important. It is only by so doing that the goodwill of the breeders will be obtained and kept.

We look forward to a time when the breeders of all animals will be far more numerous than they are to-day, because they will always be assured that as a result of their labours they will receive due and adequate reward. To bring this about breeding must receive generous support by the State, as represented at present by the Development Commissioners.

For military transport on good roads perhaps horses will be largely superseded by motors, but even so, countries without good roads are more likely to be the scenes of future warfare than not. Whether roads be good or bad, cavalry and artillery horses will always be needed. For many years the price of a four-year-old remount has ranged from £40 to £45 in this country, and if it were not for the great demand at present we should probably find the figure still merrily sticking there or thereabouts. What prices have recently been given for cavalry horses by other countries? The Dutch Government have taken the pick of many Irish horses *when three years old* at £40 to £45; the American

Government, with all its advantages for the cheap production and rearing of light horses and with the breeding industry well supported by the State, gives about £36 on an average for three year-old remounts in its own country, and mules are valued at a higher rate than this. Sir Alfred Pease leads one to infer that about £40 for a three-year-old light horse gives the breeder a fair profit here if it has been produced from a mare capable of work on a farm and suitable for breeding half-bred stock. If the foal is the product of an idle mare, he estimates that if the owner sells his first four-year-old at £90 there will only be £12 profit for him after what may be described as five years of successful breeding. Has anybody ever heard of £90 being given regularly or at all for remounts? He seems to express a doubt whether there are mares capable of full agricultural employment on a farm and suitable for breeding half-bred stock, and with his hesitation we are inclined to concur, although in one country the plan is carried out, for in Germany most of the mares outside the Government studs used to breed Army horses are put to farm work. Major Honner considers that it costs £60 to produce a sound four-year-old Army horse (presumably he means a cavalry horse). All these facts go to show that the price hitherto given for Army horses in times of peace has been much too low to ever foster and encourage the production of a large or sufficient supply.

As regards the methods adopted for increasing the production of cavalry horses, these may consist of State studs run entirely by the Government and encouragement of horse owners to breed suitable horses for the Army by registration of stallions and allocation of premium money to the owners of both mares and stallions. The one plan does not necessarily mean a closure of the other; in fact, the best results will probably accrue from a combination of the two schemes. In any case the science of breeding and the best means for its advancement will be furthered and perfected by the establishment of State studs.

In Germany most of the stallions are State owned, and at the Government studs the mares, too, belong to the State, but a great many mares used for breeding to the registered stallions are in the hands of private owners. Stallions are passed for a year only, and have to be approved of again the next. The State determines what kinds of mare and foal are eligible for premiums, and also contributes a great part of the prize money. In America,

Dr. D. M. Campbell tells us that "one third of the States, including about two-thirds of the horses in the country, have very materially aided horse breeding in the last half dozen years by stallion registration laws. No horse or jack can be used for service until he has passed an examination by a veterinarian and is shown to be free from hereditary unsoundness. A notice showing his breeding must be prominently displayed, and only pure-bred stallions with pedigrees acceptable to the State authorities can be advertised as 'pure-bred,' 'full-blooded,' 'pedigreed,' &c. The United States Department of Agriculture spends \$60,000 a year on horse breeding in Colorado and Virginia, and the two States concerned spend an equal amount." In our own country grants for light horse breeding amounting to £36,500 and £31,500 were made by the Development Commissioners to the Board of Agriculture and Fisheries for 1913-14 and 1914-15 respectively. The grants are declining in value, and this is a matter for regret.

As regards the districts in which Government stallions operate, these should be carefully picked in order that the State may not compete with privately owned and rightly registered stallions, whose owners submit them regularly for examination. Mares, too, should be periodically inspected and overhauled. Handy and plentiful markets should be indicated and established and periodical sales take place. The conditions of soil and climate need consideration as regards the type of horse intended to be produced.

A great many of the errors in connection with the estimation of an adequate price for the breeder to receive for his produce might be corrected if careful statistics as to the results of mating could be largely collected and tabulated. This is one point in favour of exclusively owned State studs. The matter of the science of zootechny has been almost wholly ignored in this country. We have read one French book on zootechny and one from the land of Ishmael, and probably there is one in America, but we have never come across a reliable text-book on the subject that has been produced in the British Isles.

The value of carefully prepared records as to the number of stallions operating in any given district, of mares covered, of live foals produced, of management of stallions and pregnant mares, and any scientific investigation and settlement of questions

affecting fertility cannot be over-estimated. There are a good many hazy points connected with breeding as yet not elucidated. From an economic and scientific standpoint it would be wise to have some of them cleared up, but this can only be done by having opportunity, such as State studs would afford, for thorough research and investigation. In America (where some estimate that 1,000,000 light horses may leave the land for this war), no less than in the countries of the Allies, far-seeing breeders and buyers are wondering what can be done to cope with the contemplated future horse famine. The answer to what must be done if the famine is to be stayed is a plain and straightforward one.

G. M.

General Articles.

RESPIRATORY ANÆSTHESIA OF ANIMALS.*

BY DR. L. A. MERILLAT.

Professor of Surgery in the McKillip Veterinary College, Chicago, Illinois.

I HAVE decided to limit my remarks to the above title because the distinguished reporters, Professor Hendricks, Professor Vennerholm, and Professor G. H. Wooldridge, will undoubtedly present the complete formal discourse on the general subject, and, besides, my experiences with intravenous, hypodermic, intraperitoneal, and rectal anæsthesia has been so disappointing from every standpoint that I lack the inspiration to write about them. On the other hand, my experience in anæsthetizing about ten thousand horses and many small animals by inhalations inspires me to report the confidence that can be placed in the old, standard, conventional method.

Naturally we Americans are proud of our achievements in this connection. We seldom fail to point with pride to that historical event in the Massachusetts General Hospital in November, 1846, where the first major operation under inhalation anæsthesia was performed. Dr. W. T. G. Morton, under whose supervision the anæsthesia was administered for this eventful operation, is a much revered man with us, and while we are not unmindful of what followed in Europe to bring his discovery into greater prominence than was possible in America at that time, we are more and more

* Paper presented at the Tenth International Veterinary Congress.

inclined, as surgery progresses, to claim for Morton a place among the great benefactors of the human race and of the animal kingdom. At least, an American speaking abroad would be accused of a sin of omission if he failed to pay tribute to Morton's memory while dealing with the subject of respiratory anæsthesia.

Veterinarians in America—and, I believe, the world over—have been very slow to avail themselves of this most effectual and most certain method of controlling surgical pain. Substitutes for this complete general anæsthesia, which only stupefy surgical patients, and local anæsthetics have always attracted more attention in the veterinary profession. Our current literature is often full of new methods of anæsthesia, but it is signally lacking in instructions on the administration and proper management of inhaled anæsthetics. We seem to be acting toward respiratory anæsthesia as if it were an exact science of which everyone is master; as if we had exhausted all of its possibilities, and, finding it faulty, we must now seek for other methods; and as if it were attended with obstacles or dangers which make it inapplicable to our work. In short, respiratory anæsthesia is still little used, and is still too little understood in the veterinary profession. It has never been extensively practised.

Anæsthesia extending to the point of complete relaxation of the musculature, in the hands of the untrained, is an exceedingly hazardous state. If prolonged for an hour or two the hazard increases. On this account a veterinarian about to perform an operation of some duration, the technique of which will require his full attention, is always inclined to avoid this method of controlling pain. In fact, it does offer disadvantages he cannot easily overcome. Trained anæsthetists are not numerous, certainly not within the reach of all veterinarians, and where one can be procured, the added cost to the already ill-paid surgeon prevents his employment. When the anæsthesia is entrusted to untrained hands, the mental strain of dividing the attention between the safety of the unconscious patient and the operation itself invites disaster from both sources.

But in spite of this dark side of the question there is such a bright side that it seems a pity we practise it so seldom. Safe respiratory anæsthesia depends solely upon keeping well under the lethal dose for a given patient. That is, *we must not poison our patients*. To produce maximum anæsthesia with a minimum

of drug is the desideratum, and it is only by accurate dosage in its highest possible refinement that this can be accomplished. In this we are confronted with the task of delivering an elusive vapour to our patients in a given quantity. That this is a problem difficult of solution I admit, but being an exceedingly important matter as well as the real solution of safe anæsthesia, it behoves us to work to this end as the expert anæsthetists of human beings are doing. Automatic mechanical measurement of vaporized chloroform or ether and the effectual delivery of a given amount to a patient will make anæsthesia an exact science. Anæsthetists of humans have the matter well in hand by utilizing complicated apparatuses adaptable for their use. Similar apparatuses applicable to animals are needed to bring our respiratory anæsthesia nearer to perfection.

When an operation is short and the patient vigorous the limit of safety need never be approached, but when the operation is a long-drawn-out affair and the patient sick and weak, the limit of safety is easily exceeded. From the beginning it has been the custom of anæsthetists to gauge the dosage by the reaction of the patient. Little attention was paid to the amount consumed. To-day the amount consumed is being pre-eminently considered, and splendid methods of regulating this amount are being worked out. The uncertainty of depending entirely upon the reaction of the patient needs no comment. Such observations are sometimes misleading. They permit of no fine explanations for the instruction of others, and thus prevent the standardization of methods through which uniform results can be achieved.

That respiratory anæsthesia may be safely entrusted to the student, the inexperienced assistant, or fellow-practitioner is wrong. The successful administration of an inhaled anæsthetic requires a wealth of experience. Of this I am convinced. Respiratory anæsthesia is safe enough when neither profound nor prolonged, and especially when administered to a sound, vigorous subject properly prepared for the ordeal. It is particularly safe when the operation is of such a character as to wield but little influence on the course of the anæsthesia. On the other hand, patients sick with disease of an enfeebling character, requiring an exhausting operation of long duration (one hour or more), very readily fall victims to badly administered anæsthetics. It is in these cases that the skill of an experienced anæsthetist is needed

to carry the patient safely through the operation and to prevent post-anæsthesia complications. Exceptionally sanguinary operations are also dangerous when the anæsthetic is badly administered. When the blood loss reaches the danger point prolonged and profound anæsthesia is exceedingly dangerous. A surgical patient weak from blood loss and saturated with chloroform or ether is always a real hazard.

I therefore divide all patients requiring general anæsthesia into three groups as follows:—

First Group.—In this group I include all patients which can be safely anæsthetized without any especial skill on the part of the anæsthetist. The operations are of short duration, and the patients are vigorous. Their afflictions have not affected the general health to any appreciable extent, and the operation will not exert much influence upon the anæsthesia. I refer here to neurotomy, tendonotomy, ablation of small growths, castrations, hoof operations, and other minor operations too numerous to mention. For such operations respiratory anæsthesia is always better than local or regional, and sometimes it is absolutely necessary to obtain the best results. Accurate work is often impossible under local anæsthesia, because these do not control the struggles against restraint. Intractable horses, vicious horses, and nervous dogs are never well controlled with local anæsthesia, and so often local anæsthesia is not complete. For example, in the operation of dividing the tendon in volar flexion the slightest jerk of the leg at a crucial part of the work prevents accuracy, and such disturbing movements are never effectually controlled by any form of anæsthesia except that produced by inhalations of chloroform or ether.

All the operations of this group are of relatively short duration, complete or prolonged relaxation of the musculature is not essential, and the patients are in good health and well prepared. The danger is therefore negligible even when the administration is left to more or less inexperienced hands. The state of unconsciousness required for these operations is but a transient hypnosis—an anæsthetic veneer—that is seldom dangerous. The painless steps of the operation, such as washing the field, shaving, paring of hoof, &c., are all done before the anæsthetic is administered; then, as soon as the painful part is completed, the patient may already be reviving while the bandages are being

applied. In this manner the time of total unconsciousness is very short.

In this group of patients I bring about a state of surgical anæsthesia in a few minutes by forcing the delivery. Sixty to ninety cubic centimetres of chloroform (for horses) is placed in the sponge, which is large enough to hold it all without dripping, the muzzle is anointed with vaseline, and the sponge is held to the nostrils in an air-tight sheet of oilcloth large enough to fold over the head when gathered up. The anæsthetist bears upon the poll, and holds the sheet in place by encircling the arms around the nose. By thus holding the nose from the floor or table the head can be well controlled against the struggles which ensue as the administration begins. In from *one to two minutes*, when the struggling ceases and the respirations become soft and more shallow, the sheet is spread out and the administration continued by dropping the chloroform through a towel stretched over the uppermost nostril. The undermost nostril is free from obstruction. In the short minor operation no especial attempt need be made to bring about a very profound state of anæsthesia, as the work is often done before all the reflexes have been banished. When, however, the operation is of longer duration or a relaxation of the musculature is desired, it is safe enough to force the administration to a successful issue by closing the undermost nostril as the chloroform is dropped into the towel on the uppermost one. This is continued until the *corneal reflexes* wane or disappear. It is not safe for the novice to push matters too far at this point. It is better for the inexperienced to err in the direction of too little anæsthesia than to venture too near the danger point. Almost all of the operations of this group can be effectually completed without entirely dispatching the corneal reflexes. The state of the *respirations* must then be kept under strict surveillance. If regular everything is well, but when a pumping or jerky state develops, the free admission of air without any chloroform must be insisted upon until the unnatural breathing corrects itself. The shallow inspiration that ends in a sudden collapse of the abdomen is a bad sign, and even the deep inspiration that ends thus must be regarded with a suspicion that the danger-point is being approached. I always hesitate to say too much about the corneal reflexes as safeguards against danger because too much dependence cannot be placed upon them.

Better to note carefully the story being told by the respirations, and secondly, the pulse, than to depend so much upon the cornea. The cornea gives a fair idea of the state of anæsthesia, but it is never a safeguard against asphyxia or syncope. *Guttural sound* is a cue for the anæsthetist to draw the tongue forward to prevent it from crowding the pharynx. The pulse in this transient and incomplete anæsthesia may be very slow and soft without pre-saging danger, but when the artery becomes empty and the pulse waves become distinctly separated one from another, the danger-point from embarrassment of the heart is near.

To keep within the bounds of safety, the anæsthetist who is inexperienced must be instructed to withhold the anæsthetic, extend the head, draw the tongue forward, and leave the nostrils free from obstruction on the very first appearance of any unnatural behaviour of the respirations or pulse, even at the risk of annoying the operator; and should the respirations cease entirely artificial respiration must be induced instantly. No time must be lost by giving medicaments, as artificial respiration is most important. The best method of restoring the respiratory function is to press the foot into the abdomen firmly and deeply, but not harshly, at first three times per second, and then oftener if these fail. Care must be taken not to obstruct a spontaneous inspiration that might be taken while these exercises are being done. Simultaneously with these manœuvres, others are engaged in extending the head, withdrawing the tongue, releasing the restraining ropes, harnesses, belts, &c., and, as soon as possible, the patient should be rolled to the opposite side to prevent blood stasis. A medicinal dose of strychnia may be given hypodermically. Inhalations of ammonia I have found to be harmful. When these means fail in the horse little else can be done—the patient is dead. In the dog swinging the body to and fro from the hind legs, rubbing and slapping the body is sometimes effectual after artificial expansion of the thorax has failed. Artificially induced respirations come first in resuscitating patients overwhelmed with an inhaled anæsthetic, the others are subordinate. As long as the heart still beats, no matter how feebly, there is still hope of exciting the respirations into activity, but when the heart ceases to beat, I fear we have but little chance to revive our over-anæsthetized patients. It is, however, only rare that the heart is the original mischief-maker, and when it is, the patient is at once beyond hope of resuscitation.

When one of these short operations has been completed the restraint apparatus is removed and the patient is allowed to lie stretched out until it will react to the loud clack of a strap across its rump. It can then stagger to its feet with a little assistance, and, after a few uncertain steps, soon regains its equilibrium. Depending upon the duration and depth of the anæsthesia, this is from fifteen to forty minutes after the last bit of anæsthetic was given.

Thus far I have endeavoured to show the kind of subjects that can be anæsthetized with safety, and the general plan of administration used in our clinics. With few variations in the apparatus used this is a fair description of the prevailing American customs. In conclusion, I desire to repeat that it requires no especial skill or knowledge not possessed by any veterinarian successfully to handle respiratory anæsthesia in healthy animals when the operation is of short duration. We find that veterinarians who adopt respiratory anæsthesia in the general plan of these minor operations soon use it to the exclusion of all other methods, and, besides, they soon become more proficient surgeons as well as expert anæsthetists.

Second Group.—The second group of patients presents the surgeon with an entirely different problem. In this group we include animals more or less enfeebled by the disease for which the operation is to be performed, and all those afflicted with diseases requiring long-drawn-out sanguinary operations. Among these are poll-evils, fistulæ of the withers, septic podotrochilitis, carcinoma of the eye, mammæ or penis, actinomycomata, scirrhus cords, large tumours, wounds with visceral complications, thecal abscess of the fetlocks, and others too numerous to mention. In these cases we miss the aid of the expert anæsthetist. The broadest knowledge of anæsthetic drugs and their remotest behaviour in the organism, coupled with skilful handling that can only be learned by wide experience, is absolutely essential to bring these subjects safely through these operations and the post-operative convalescence. It is in these operations that respiratory anæsthesia has proved such a hazard to veterinarians who have practised it without trained help. In these long operations it is inconvenient unless an anæsthetist in whom the surgeon has implicit confidence is employed. In fact, it is so hazardous and inconvenient that veterinarians seek refuge in all

sorts of substitutes that only stupefy their patients. But these substitutes are not anæsthetics, they are only subterfuges. They do not answer the purpose of a real anæsthetic from any standpoint, and the only reason they are used is found in the fact that respiratory anæsthesia has been found dangerous in the very class of operations in which it is most needed.

Our death-rate from anæsthesia, and during anæsthesia, in the first group of patients has been low, but in this the second group it has varied in strict obedience to the skill displayed in the administration. In our clinics, where a more or less skilled anæsthetist is always available, the mortality is not high—in fact, it is very satisfactory; but when it becomes necessary to operate in the rural districts, where there is no trained help, the death-rate is appalling. An anæsthetist at the Mercy Hospital, Chicago, U.S.A., has anæsthetized 45,000 patients without a single death during anæsthesia, and, while such a record is worthless until it includes the post-operative history of the same patients, it shows that veterinarians are far behind surgeons of human beings in the handling of respiratory anæsthesia. In animals there are no statistics at hand from which the danger or safety of anæsthetics can be determined. I am, therefore, compelled to report only my own observations, and from these I have learned the lesson I am endeavouring to report—that is the danger of leaving the administration of respiratory anæsthetics for long, serious operations to untrained hands, and the relative safety of leaving it to the very same hands for short, simple operations. In short, the relief from this unfortunate situation which prevents us from resorting to inhalation anæsthesia where it is most needed will be found in the expert anæsthetist. I have always encouraged my students to practise respiratory anæsthesia, soundly condemning all other kinds of general anæsthesia, in order that we might develop more experts among us.

I shall now describe two methods of administering respiratory anæsthetics for serious operations that have proved the safest at my hands.

First Method.—An animal about to be submitted to a serious operation is conditioned into as healthy a state as possible by grooming, cleaning, feeding, exercising, &c. The volume of the intestinal contents is reduced by careful feeding, and food is withheld just before the patient goes to the operating table. The stomach should be empty.

As chloroform, although the most effectual drug for all animals, is entirely too toxic to be administered alone through a long operation, we resort to (1) a *preliminary anæsthetic*, (2) the *anæsthetic proper*, and (3) a *terminal anæsthetic*.

As a *preliminary anæsthetic* we administer chloral hydrate *per os*. Thirty to forty grammes dissolved in a litre of hot water is given as a drench one hour before the operation. Chloral given *per os* on an empty stomach gives a fairly uniform action. It is always safe, and may be depended upon to do all that is required of a preliminary anæsthetic.

As the *anæsthetic proper*, we administer chloroform with a sponge and a canvas cylinder. The canvas cylinder is 1 ft. in diameter and 18 in. long, closed at each end with a tobacco-pouch string. One end is drawn over the nose, drawn tightly and fastened to the halter to prevent slipping off. Through the other end the sponge containing 30 c.c. of chloroform is placed against the nostrils. If a state of anæsthesia is not promptly produced another 30 c.c. is added to the sponge. The free end of the cylinder is held shut with the tobacco-pouch string or with the hands. As soon as the reflexes are well under control the cylinder is folded back so as to expose the nostrils, and the work of maintaining a satisfactory state of anæsthesia is begun by administering the terminal anæsthetic composed of equal parts of alcohol, chloroform, and ether. This is administered through a towel laid over the nostril. The part immediately over the nostril is kept well soaked with the mixture. Air is allowed to pass freely through the undermost nostril. If the patient is obstinate we advise against the second use of the bag, but recommend that the undermost nostril be closed and results patiently awaited from the administration of the mixture through the towel. When an exceptionally profound state of anæsthesia is desired, as, for example, when a deep state of relaxation of the musculature is essential, pure chloroform may from time to time be dropped into the towel instead of the mixture. In this manner we seldom poison a patient by erratic delivery, and while the state of anæsthesia is not as profound as some would desire, it is usually sufficient to enable one to perform almost any veterinary operation. Shock from slight anæsthesia is not common, but when it is possible to block the reflexes by cocainization of a nerve-trunk I advise that this be done. It was Crile (Cleveland,

Ohio) who demonstrated that the brain is continually being bombarded with impressions from the seat of the operation in spite of even very profound anæsthesia. If this explains the cause of shock after prolonged operations we, too, should resort to nerve-trunk cocainization whenever the seat of operation is conveniently located. In small animals we use this same general plan, but administer chloroform with much greater care as regards regular and decisive delivery, as these animals are more susceptible to over-dosing than the large herbivora. For dogs especial apparatuses are handy but not essential. Ether is more fool-proof in small animals than chloroform, and should be chosen by inexperienced anæsthetists.

Second Method.—The second method of administering respiratory anæsthetics for serious operations is one I shall recommend with great caution, because it has only recently been introduced into our clinics. It is the *endotracheal delivery* which differentiates it from our old plan. The other features are analogous. We administer the preliminary anæsthetic of chloral, and then deliver the anæsthetic proper and the terminal anæsthetic into the trachea with an atomizer. The rubber tube entering the atomizer is attached to a foot-bellows, the bottles containing the anæsthetics are placed into a small wooden box containing also an electric incandescent light to raise the temperature of the liquid, and the delivery tube is placed into the trachea through the uppermost nostril.

The foot-bellows agitates the warmed liquid and delivers it vaporized directly into the air passages. We deliver pure chloroform until anæsthesia is produced, then shift the delivery tube to a bottle containing the terminal anæsthetic of alcohol, chloroform and ether, also contained in the wooden box. We have used this crude apparatus with such splendid success that it seems worthy of improvement. Patients fall rapidly and safely into a surgical anæsthesia, and the exact amount of vapour delivered can be determined. There is none lost in the surrounding atmosphere.

The delivery tube can be very easily placed into the trachea in large animals. In small animals the opposition makes the method less inviting; and, as in human beings, it is necessary first to bring about anæsthesia with a face-mask, and then prise the mouth open and deposit the tube. This hindrance leaves it hard to recommend for dogs and cats.

FATALITIES AND OTHER UNTOWARD SEQUELÆ.

Serious results from prolonged anæsthesia are due chiefly to over-saturation—the patient is poisoned. If overdosed patients survive the operating period, they may even die afterwards or produce havoc by falling into a more or less serious state of delirium. *Chloroform* delirium supervenes on long sanguinary operations. The unfortunate subject perspires copiously, rolls its eyes, fights with all-fours, and makes futile attempts to rise. If it finally regains the standing posture it lunges forward, presses the head to the wall, and falls about entirely oblivious to its surroundings. These manœuvres are, of course, disastrous to the seat of operation. Ligatures slip off, sutures are torn, and in fact general havoc to the wound results. This unfortunate sequel is often the unhappy end of an otherwise splendid operation where accurate dosage is ignored. It occurs in different degrees of severity in strict obedience to the amount of chloroform consumed. Some end fatally, some die from wound complications, while others recover after a few hours, little injured by the ordeal through which they have passed.

Pneumonia, I have found, seldom follows chloroformization without some other influence. Embolism and the enfeeblement following the operation are more to be incriminated than the chloroform. When influenza is prevalent there is more danger, but I have never seen it follow chloroform anæsthesia where these added influences do not exist.

Heart-failure is a rare accident where ordinary care is exercised to avoid susceptible subjects. With me it has occurred chiefly in animals affected with heaves, laryngeal hemiplegia, obesity, and senility. An aged fat horse leading an idle life must be anæsthetized guardedly. Reflex syncope in which the amount consumed plays no part has occurred twice in my experience. These two animals (horses) died suddenly at the very beginning of the administration. Both of these animals were fat and lacked vigour.

Asphyxia is the usual form of death during anæsthesia. Due either to erratic dosing or to over-dosing, the prevention is found in keeping the amount consumed as low as possible, delivering the vapour regularly, and in watching incessantly for unnatural respiratory movements.

I have experimented somewhat with the *intravenous delivery*

of both ether and chloroform, but have thus far been unable to bring about a satisfactory state of anæsthesia without endangering the patient's life from over-dosing. It is, however, evident that there is still some justification in experimenting further with this method. We need an apparatus that will deliver a regular flow and that will keep the anæsthetic at a uniform temperature. With this provided for we may yet decide upon this method of administering anæsthetics to animals to the exclusion of all others.

SUMMARY AND CONCLUSIONS.

(1) For slight anæsthesia suitable for short operations the respiratory delivery is safe even in the hands of untrained anæsthetists.

(2) For the profound anæsthesia required for serious and long operations, respiratory anæsthesia is safe only in the hands of experts.

(3) The most discouraging part of respiratory anæsthesia for animals is the difficulty of regulating the dosage. We need an apparatus to automatically measure the vapour delivered and consumed by the patient.

(4) For profound anæsthesia of considerable duration, the best way to keep within the limits of safety is by administering a preliminary anæsthetic of chloral, followed by chloroform, and then maintain the narcosis with a terminal anæsthetic of alcohol, chloroform, and ether.

(5) Despite profound anæsthesia exhaustion of the brain follows serious operations. This may be prevented by blocking with cocaine the nerve-trunks which lead from the seat of operation.

(6) The endotracheal delivery of respiratory anæsthetics is worthy of a trial. It is a step in the direction of dose regulation suitable for animals.

(7) Intravenous delivery of ether and chloroform is unsafe with the apparatus we now have for their administration.

DISTOMATOSIS, OR LIVER FLUKE, IN CATTLE
AND SHEEP.

BY ROWLAND WILLIAMS, M.R.C.V.S.

Fasciola hepatica, the common liver-fluke, is a leaf-shaped parasite. It is slate-coloured, and has in this country a crinkled edge. It is about 1 in. in length, and from $\frac{1}{4}$ to $\frac{1}{2}$ in. broad. The parasite is found in the liver of cattle and sheep, sometimes in such large numbers that it occludes the bile-ducts and causes death to the host.

On *post-mortem* of an infected animal it depends to what extent the host is affected, and the length of time it has been affected, as to whether fat and good condition are present, or emaciation. Animals newly or only slightly affected seem to thrive well, and, on the contrary, animals affected for a long time or heavily infested with parasites are emaciated. The liver will be observed to be enlarged, also the gall-bladder, and the bile-ducts will stand out and be much whiter than normal. On section the bile-ducts will be thick and fibrous.

The loss in this country last dry season was large enough to be important. Cattle affected last rainy season would probably not stand the drought like healthy cattle, and a large percentage have died of so-called poverty. On one ranch in Mashonaland the loss was very heavy; about 70 head of cattle died out of 1,000, and upon investigation the animals were found to be heavily infested with these parasites.

At present there is no known treatment for this disease. Many remedies have been tried without satisfactory results, and it will be understood how difficult it is to reach with a drug a parasite so well protected by the thickened bile-ducts in the liver.

To owners of farms free from this pest, a rough life-history of this parasite will be helpful in taking preventive measures.

The adult hermaphrodite inhabits the bile-ducts of cattle and sheep, and at certain periods, in accordance with the food the host consumes, lays eggs which pass out of the host with the *fæces*. Should these eggs be dropped on wet stagnant land, or on the edge of water holes, out of the egg is hatched a small swimming form of the fluke which finds for itself a host in a snail, in which it occupies part of the air chamber or lung; there another metamorphosis takes places, giving rise to still other forms of the

parasite in large numbers. These forms break free from the now dead snail, attach themselves to blades of green grass, and there encyst and wait until some ox or sheep eats them, and so the cycle goes on.

I would suggest the draining of stagnant land as a means of prevention. The keeping of ducks and geese would, I think, help to keep down the snails. Salt is recognized as a good dressing for land affected with fluke.—*Rhodesia Agricultural Journal*.

A DEFENCE OF GOVERNMENT HORSE BREEDING.

By J. N. HORNBAKER, D.V.M.

REFERRING to the article in your issue of December 3 by General John B. Castleman concerning "Government Horse Breeding," I was sorry to learn that the different breeding projects which the Bureau of Animal Industry is conducting have been confounded with the breeding of horses for Army remounts. I also wish to take exception to some of General Castleman's statements relative to the cost of raising colts by the farmer, and the inducements offered them to co-operate in this work.

The Bureau of Animal Industry's Service Announcement for April 15, 1913, states that in placing remount stallions "local wishes will be respected and the breed of stallion placed in a community will be that which is most generally preferred by that community. . . . Furthermore, every effort is to be made to avoid competing with privately owned stallions, and horses will not be placed in communities which are already well supplied."

Parties breeding mares to Government stallions give the Government an option on the resulting foal at \$150 during the year it is three years of age. The breeder is not held to this option, for if he wishes to be relieved he may pay the service fee of \$25 at any time before the colt is taken up by the Government. If the foal dies no service fee is charged. If the colt is offered to the Government and purchase refused no service fee is charged. If the colt is purchased by the Government at \$150 no fee is charged, making the price equivalent to \$175.

Further, suppose, for instance, a farmer breeds five mares and each delivers a foal. According to the opinion of some of our

best breeders the average farmer may raise one out of five for which he may expect to receive a better price than the Government agrees to pay. On this latter colt he will pay a fee of \$25 and the remaining four may be sold to the War Department or otherwise exempted, thus making a total service fee of \$25 for five three-year-old colts. Another advantage to the farmer is that a purchasing officer of the Army will visit the different localities in which the stallions have stood, for the purpose of buying these colts, and no doubt many horses sired by privately owned stallions will be bought at the same time. Hence a better opportunity is offered the small farmer to sell his colts direct at a fair price with the least possible effort on his part.

The following data on the cost of raising horses were secured by the statistical division of the Department of Agriculture by corresponding with hundreds of farmers and stock raisers in each State: In Virginia the average cost of raising colts to three years of age was shown to be \$108.94. This total amount was made up of the following items: Service fee, \$11.27; value of time lost by mare, \$9.69; breaking, \$2.21; veterinary fees, \$1.55; incidental expenses, \$3.53; feed, care, and shelter, \$80.53. The average total cost for raising three-year-old colts in Kentucky was \$103.06, and for the entire United States \$104.05. Taking the figures giving the total average for the United States (\$104.05), and deducting the service fee (\$12.94) and the cost of breaking (\$2.22), we have left \$88.88, which should represent the average cost of raising colts on the remount plan where the Government donates the service fee and the colts are not required to be broken. It is also interesting to note that these data show the average value of three-year-olds in the United States to be \$136.17.

As a further comparison of the price of horses, attention is invited to the fact that the War Department received bids in November, 1914, from contractors in Kentucky, Virginia, and Missouri, proposing to supply 500 horses at \$145, \$143, and \$119 respectively. It is certain that each bidder expected to make a profit of from \$5 to \$15 per head in the event the contract was awarded him. Therefore, if we deduct the dealer's profit and expense from his proposed selling price we can make a close approximation of the price at which many farmers were willing to sell.

During the 1914 season the Government stallions were located in Virginia at Staunton, Flint Hill, Orange, Fredericksburg, Boyce, Gainesville, Bluemont, Front Royal, Harrisonburg, Savannah, Gloucester, Woodstock, Lexington, and Madison. If General Castleman will investigate these locations he will find the Department taking Government stallions into our poorer sections as an inducement to the farmer to get good mares and raise horses. The large number of mares served in these localities by Government stallions shows that the stallions are wanted. In fact, every owner with whom I have talked claimed that the stallion is a very unprofitable investment. It is therefore difficult to understand how the Government is competing with privately owned stallions and is "competing with a farmer and driving his mares from a producing field," by offering him a desirable stallion to which to breed his mares with a promise to either buy the foal or exempt him from paying a service fee.

General Castleman attempts to bring out the point that Germany, Austria-Hungary, France, and Belgium, which have Government-controlled horse breeding, would be able to produce only half as many horses as this country, which has no Government-controlled horse breeding, thereby implying that Government control is a handicap to horse production. As a matter of fact, the total area of the countries named is only about one-fifth that of the United States, consequently these same countries are producing many more horses per square mile than is this country. It seems to me that this is an argument for rather than against Government-controlled horse breeding.

From the character of the fighting in the present European war, where cavalry manœuvres have been of much importance, it is evident that the Government-controlled studs have been a great factor in securing high-class mounts. For Congress to appropriate money for the purpose of encouraging the production of horses for military use is to be recommended because it is a national phase in the proper horsing of our Army and at the same time encourages the farmer in the production of better horses, which is analogous to encouraging the growing of better crops of corn or wheat.—*The Breeder's Gazette*.

OPEN JOINTS.*

By J. N. FROST.

Ithaca, New York.

THE literature in regard to suppurative arthritis seems to be a minus quantity so far as veterinary surgery is concerned, and the case reports are few. As one medical work states, "Our knowledge of joint disease is so imperfect that no opportunity should be lost by which clinical data may be added."

Causes.—The causes of open joints are kick wounds, nail punctures and the like, which not only open the joint capsule, but are liable to carry infection to the joint cavity, where synovia serves as a favourable medium for the development of the bacteria. Another cause, also, is the extension of necrosis from neighbouring areas of infection, such as tendon sheaths or bursæ. Likewise it may result by the process of metastasis from some distant suppurating foci.

The severity of articular wounds is not due to the lesions produced, but to the inoculation of the wound with bacteria. When pyogenic organisms gain entrance to a joint cavity they lead to inflammation of all the structures of the joint, followed by suppuration, and, unless overcome, to the destruction of the joint cartilage and the discharge of the same in the form of pus, leaving the ends of the bones bare and rough. Naturally, this leads, in those joints where the movement is limited, to ankylosis or stiffness of the joint.

Symptoms.—If the wound of the joint is small and made by a clean instrument, the only symptom may be the discharge of synovial fluid. In most cases there will be, however, some infection which results in signs of irritation, such as swelling of the joint, increased synovial fluid, or tenderness on palpation. If the infection is severe there will be cedema, fever as high as 104° to 105°, with pulse and respiration increased. The patient holds the swollen painful articulation in a position to relieve the pain as much as possible, touching only the toe to the floor. Frequent convulsive movements are made with the leg, indicating pain in the part. The tissues surrounding the joint are inflamed and swollen, and there is a discharge of synovia from the wound, which at first is a slippery, transparent straw-coloured liquid.

* Paper read at the Seventh Annual Conference, New York State Veterinary College.

Synovia may be recognized by its tenacity if the finger which touches the fluid is slowly withdrawn. This is a sure sign that the fluid has come from a synovial bursa, or in other words, that it contains mucin.

As inflammation of the joint advances the synovia is discharged in thick, heavy clots. After the synovial membrane becomes infected, its secretion is greatly augmented, and the discharge is a thick yellow mixture of pus and synovia, which is thrown off in large quantities.

The loss of flesh is exceedingly rapid, even though the appetite remains good. Due to long periods of decubitus, sore and infected areas develop on the skin over the external angle of the ilium, the shoulder, and the supra-orbital process of the head.

The differential diagnosis between a suppurative arthritis and suppurating tendon sheath is not always easy, as the discharge from each has the same general appearance and around most of the joints there are tendon sheaths which may become opened more readily than the joint. There is usually a difference in the degree of lameness. The animal with open tendon sheath does not ordinarily show as great pain upon movement or upon bearing weight on the part as does the animal with open joint.

By probing we can usually make our diagnosis positive. We are told by many that probing should not be resorted to, and this no doubt is true if it cannot be done in an aseptic manner. We fail to see, however, why there should be danger if we are careful to disinfect the wound and then use a thoroughly sterilized probe. After probing we are in a position to give a more accurate prognosis and treatment.

Treatment.—The treatment of suppurative arthritis is highly unsatisfactory, necessarily of long duration, and in a great percentage of cases is unsuccessful. The death-rate has resulted in the trial of a great number of drugs, including poultices, blisters, continual irrigation with weak antiseptic solutions, ointments of camphor, alum, calomel, and corrosive sublimate.

In the treatment of open joints they may be divided into two groups:—

(1) Open joints, such as the stifle, shoulder, elbow, &c., where ankylosis cannot occur, or, occurring, would destroy the usefulness of the animal.

(2) Open joints which, if ankylosed, will not seriously impair

the value of the animal, such as the smaller tarsal joints of the corono-pedal joint.

The first question to be decided when a joint is involved in acute suppuration is whether an attempt should be made to prevent ankylosis or whether the process should be favoured.

Taking the first group, which comprises the more important joints, and in which ankylosis would be disastrous to the usefulness of the animal, we find it impossible, or least impracticable, in the larger animals to bandage these parts. If the joint is not infected by the object causing the injury, it is almost certain to become infected by exposure. In treating these cases we must prevent too great an infection, which causes an inflammation and destruction of the capsule and cartilage, and thereby results in ankylosis. We must also be careful that our antiseptics are not so strong as to cause some irritation to the joint capsule and cartilage, producing an inflammation of the same as well as increasing the chance for infection, and in so doing hasten the destruction of the part.

It is a known fact that most of our antiseptics cause irritation to the tissues even in a strength which is too mild to harm bacteria. Our antiseptic then must be one that not only prevents the growth of bacteria, but also that does not produce irritation of the tissues.

We have found pure glycerine to be an agent which produces no visible irritation of the tissues, and we have also found that bacteria fail to multiply upon it. According to Rideal on "Disinfection and Preservation of Food," bacteria and insects are killed by undiluted glycerine, since, having a very low diffusive power, it causes death by desiccation. Spores with thicker envelopes resist it indefinitely, and on dilution of the glycerine begin to grow immediately. Cultures made in the laboratory of streptococcus and staphylococcus and mixed cultures from cases of fistulous withers fail to make any growth on glycerine. The injection, under aseptic conditions, of pure warmed glycerine into the hock or stifle joint of a horse causes the animal no distress, and is followed by no increased heat in the part, no pain upon pressure, and no change in the gait of the animal.

We find also that when we inject under aseptic conditions one part of Lugol's solution to four parts of glycerine, or in other words, 20 per cent. Lugol's solution in glycerine, it fails likewise to cause irritation.

In order to determine the amount of irritation produced by glycerine, we injected 2 oz., slightly warm, into the joint capsule of the hock of a horse. Twenty-two hours later the animal was killed. It had shown no signs of irritation, and the capsule of the joint failed to show any congestion. Another animal, treated in the same way, was killed forty-eight hours after injection, and failed to show any symptoms, and the joint capsule remained normal. Two other animals were injected in the stifle joint in the same manner. One was killed on the third day; the other, at the end of two weeks. Neither showed any ill-effects from the injection, and the joint capsules remained normal. In all, fourteen horses were injected, and none showed any signs of a disturbance in the joint.

Later, injections of 20 per cent. Lugol's solution in glycerine were made in the same manner, and the animals killed at intervals of four, eighteen, and forty-eight hours and three weeks. In all, we were unable to see that any irritation had been produced.

The treatment recommended by us for open joints, in which we wish to prevent ankylosis is, first, to shave all hair from the area surrounding the wound, following with a thorough cleansing of the skin and disinfection of the wound, and then to inject a 20 per cent. Lugol's solution in glycerine into the wound. This should be repeated two or three times a day, each time enough of the solution being injected to fill the joint capsule, thereby securing the flushing effect. As this solution does not cause any irritation to the tissue and yet is a strong antiseptic, it serves to shorten the period of congestion and inflammation and to overcome the infection without causing a destruction of the secreting membrane until the external wound has had time to heal. The injection of this solution seems to retard the excessive secretion of synovia. The larger the joint capsule and the smaller the external wound, the longer our antiseptic will remain in contact with the inflamed tissues as the glycerine, being thick, does not flow readily through a small opening.

In treating Group 2, those joints in which ankylosis does not impair materially the value of the animal, we believe the treatment should be much the same in the beginning as in Group 1. If we find the secreting membranes are highly infected and cartilages are becoming eroded ankylosis is bound to occur, and we should direct our treatment towards hastening the process.

In this group we can use the bandage and antiseptic pack to good advantage, as all of these joints may be readily bandaged. The application of a 1:100 corrosive sublimate or other antiseptic pack should prevent further infection to the part. In making the pack, we have found it advisable to use gauze in place of cotton, as the gauze allows the secretion to pass through and thus drain away, while the cotton has a tendency to dam back the secretions and hold them in contact with the wound and prevent the flushing action produced by the secretion of synovia. The free discharge of synovia acts as a flushing agent, and thus carries out infection and pus from the joint cavity. The proper application of the pack and bandage constitutes the first principle in the treatment of inflammation, namely, rest to the part, by preventing or lessening the motion of the joint. Motion results in irritation to the tissues and promotes infection. We may render the joint immovable by the use of splints, shoes with a brace, or tar bandages and heavy packs. That this lessens the infection and pain greatly is shown by the unusual amount of weight which the animal will bear on the part.

By making a free opening into the joint, we may be able to curette away the joint cartilage and thus hasten the process of ankylosis. Then, too, by increasing the size of the opening into the joint, we have a better opportunity to disinfect thoroughly the joint cavity, overcome the infection, and thus prevent fatal sepsis. Abscesses in the periarticular tissue should be opened wherever they occur and their cavities thoroughly drained and disinfected.

For the purpose of disinfection we have found long narrow strips of gauze saturated in tincture of iodine to be of great benefit. The iodine also serves as more or less of an irritant, and causes a destruction of the secreting membranes and joint cartilage which must take place before we may hope for recovery.

In the human being and in the smaller animals there is another operation which may be resorted to—amputation. When the infected area is great and there is danger of death from septicaemia, the removal of the distal portion of the member allows of thorough disinfection of the joint, as well as the removal of the infected area which is producing the sepsis.

We do not favour the use of slings in disease of the articulations, believing that the animal, if worth treating, is able to get up and down readily if given a box stall with sufficient room. Certainly a horse, if given a proper amount of dry bedding to prevent decubitus gangrene, rests more comfortably in a large stall than it does in a stiff pair of slings. Another point, which is often ignored, is the removal of the shoes from a horse which is spending much of its time in a recumbent position. The bruising of the pectoral region from the front shoes, and the resulting infection may be sufficient to overcome the animal that is fighting to withstand the attack of septicaemia which is resulting from suppurative arthritis.—*American Journal of Veterinary Medicine.*

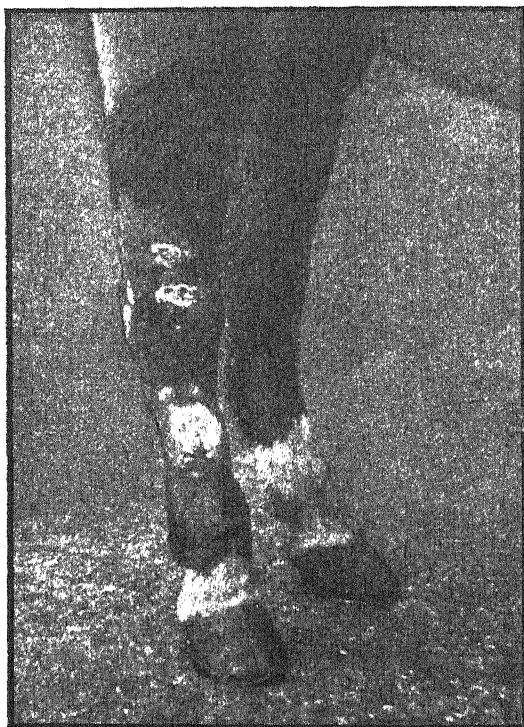
Clinical Articles.

A PECULIAR CASE.

By J. F. D. TUTT, M.R.C.V.S.

Winchester.

THE subject was a bay mare, 10 years old, sent into hospital owing to large "sores" on the off hind limb. These lesions are well shown in the accompanying photograph. The "sores" discharged a little sanious fluid, and showed no tendency to



increase in size or to diminish under treatment, nor did any more appear on the limb.

The mare was tested twice with mallein by the subcutaneous method, and in each case gave a temperature reaction, but no local reaction of any consequence.

Not being satisfied, the ophthalmic test was applied twice

at intervals, and each time a positive reaction was obtained—the eyes of “control” horses failed to give any reaction.

On this evidence it was decided to have the mare slaughtered.

Post-mortem Examination.—A careful examination of lungs, &c., failed to reveal any glanders lesions. The lungs were, however, in the condition known as anthracosis—were emphysematous—and there were old pleurisy lesions on the right lung.

Remarks.—The question that naturally arises is why a doubtful or negative reaction was obtained with mallein when given subcutaneously, and a positive reaction when given ophthalmically.

TOXIC ENTERITIS AND CONSTIPATION IN THE DOG.

By G. MAYALL, M.R.C.V.S.

IN the following two cases I wish to mention a line of treatment which has hitherto not been frequently adopted in this country for the complaints named. I am indebted to the “Text-book of General Therapeutics,” by Fröhner (p. 134), for one half of the treatment, and to a paper by Marquet, on “The Internal Use of Liquid Paraffin,” for the other half. This appeared on p. 44 of THE VETERINARY JOURNAL for January, 1915.

On February 16 I was called to see a rough-haired fox-terrier dog that had been vomiting, and passing pultaceous blood-tinged fæces. I found my patient able to get about listlessly, with a temperature of 103° F., and with a mouth in a bad state from loose, tartar-infested, and decayed teeth. He was about 10 years old. I gave him a 3 gr. dose of calomel, and ordered him to be put on Brand's essence and barley and milk. On calling next day I found him lying disconsolately with a temperature of 104° F., and having passed a small quantity of semi-solid, blood-tinged fæces.

I injected him up the rectum with 3½ pints of warm water, to which common salt had been added in the proportion of about 1½ dr. to a pint of water. The injection was made with the dog's mouth tied up, his hind feet held up by an attendant and his fore feet resting on the ground. In less than five minutes vomition occurred containing greenish slime and particles of food. A second injection was followed by clear vomit. I now gave him a teaspoonful of liquid paraffin (better known to the

chemist as pure liquid petroleum), which was kept down. Next day he was weak and prostrate, but his temperature was down to 101° F., and his general condition seemed better. I gave him a second teaspoonful of paraffin. He had taken some Brand's essence and a little barley and milk on the morning of my visit and had retained them. Next day I was informed he had passed some soft fæces in the night and had taken more fluid nourishment. He got up and walked about while I was present and seemed considerably brighter. Eventually he made a good recovery, his bowels being regulated by occasional doses of paraffin, and care being taken to put him on semi-solid and solid food, chiefly of a farinaceous kind, gradually.

On March 4 a valuable Airedale dog of large size was brought to me with the history that he had been vomiting and had passed no fæces for four or five days.

I injected him with two quarts of salt and water until he vomited clear fluid. I then gave him a dessertspoonful of liquid paraffin, and next morning was pleased to see he had passed a fairly copious motion. He had been receiving laxative medicine previous to coming to me, but it had not had the desired effect. He has done well.

The salt-water injection treatment has been carried out at the Copenhagen Clinic and at the University of Pennsylvania for some years, and with very good results in all classes of dogs.

Those of us who know how frequently dogs suffer from toxic, hæmorrhagic, and catarrhal ailments of the intestine, and how often these prove fatal, notwithstanding the use of the latest medicaments, will be inclined, I feel sure, to try a new line of treatment and record results.

My experience, even if only scanty, has at any rate been gratifying. I think the two treatments by paraffin and copious salt-water injections are about the most rational yet put forward for intestinal complaints in dogs. It is always advisable to inject the dogs and watch them vomit before giving the paraffin. The reason for this will be obvious. We get a reasonably clean intestinal tube before administering medicine, and limit the dangers arising from toxin formation and auto-intoxication.

DEVELOPMENT OF A CYST INTO AN ABSCESS IN
THE ŒSOPHAGO-LARYNGEAL REGION.

By J. SCHANTYR.

IN a four-year-old dog a hot, slightly painful and fluctuating swelling arose on the anterior and right side of the upper third of the neck, which extended from the intermaxillary space to the posterior wall of the larynx. The mucosa on the right side of the mouth was much inflamed and thickened. On pressure from below upwards on the swelling at the neck a long fluctuating elevation the size of a pigeon's egg gradually arose in the oral cavity on one side and to the right of the tongue, and then the external swelling became smaller. The body temperature was 102·8° F. After opening the swelling, which was diagnosed as an abscess, greyish-green pus was evacuated. Closer examination of the abscess cavity showed that it consisted of two parts. The wall of the hinder larger portion was uneven; the wall of the anterior, on the contrary, smooth and even. The latter was the size of a hen's egg, sharply defined, and situated on the lateral side of the head of the Œsophagus and of the larynx. Both divisions communicated by an opening 1·5 cm. wide.

As cysts often occur in the neck region in the dog, Schantyr considers that the anterior abscess cavity with smooth walls was a purulent infected cyst, whose contents after opening had discharged into the subcutaneous tissue of the region.—*Record of Scientific and Practical Medicine.*

A SEVERE CASE OF ARTICULAR RHEUMATISM IN
THE DOG.

By RÖHSLER AND SSEREBRENNIKOW.

IN a young dog 1 year and 9 months old, which was brought to the clinic on account of loss of appetite, there was diagnosed catarrhal inflammation of the nasal, pharyngeal and laryngeal mucosæ, increase of heart dulness, and quickening and arrhythmia of the pulse. The gait was stretched. On the third day the animal went markedly lame, and the right carpus and elbow-joint were swollen, hot, susceptible to pressure, and movement painful. In the course of the next eight days the inflammation attacked the other joints in the following order: left elbow-joint, and both

shoulder-joints, then the right and left stifle and hip-joint. Movement was performed with difficulty and pain, finally the animal became continuously recumbent. Besides there were fæcal stasis and superficial breathing. On the first and last four days of the illness the temperature stood at 104° to 105° F. Treatment with sodium salicylate brought no improvement, and the greatly cachectic dog was killed.

Post-mortem showed: Increase and yellowish-red discoloration of the synovial fluid, with the presence of fibrin shreds in the joints affected. The region of the joints was permeated by small or large hæmorrhages and cedematously infiltrated catarrh of the gastro-intestinal canal, serous pericarditis, adhesion of the epicardium with the pericardium, dilation of the heart, marked attenuation of the cardiac walls, especially of the right ventricle, and slight thickening of the valves of the heart.—*Record of Scientific and Practical Medicine.*

A CASE OF PUTREFACTION IN UTERO.

By W. P. BOSSENBERGER, D.V.M.

ON November 30 I was called about twelve miles to see a cow suffering from a strange case of dystokia. The animal, a large Holstein cow, was due to calf the latter part of the preceding August. The owner attended the state fair for a few days about this time, and on his return found the cow showing all signs of having delivered normally. The milk secretion was normal, the flanks and hips were sunken, and a portion of after-birth was hanging from vulva. A search for the calf was made, but failing to find it, the owner supposed that dogs had eaten it, and nothing further was thought of case; the cow appeared normal in every way.

November 30, while doing chores, the owner saw the cow in labour, and going to her assistance and attempting to use traction on foetus caused the skin and flesh to be pulled from bones. Then I was called and found the head and one fore foot presented; the other front leg flexed at the knee. The genital organs of the cow were so firmly contracted upon foetus that examination was difficult; only the flat hand could be passed

between uterus and foetus. In attempting to straighten the fore limb it gave way at the knee.

After all was properly placed traction was applied, but to no benefit. Then the foetus was well greased with lard and traction again applied; still the foetus did not move more than an inch. A block and tackle was applied, and two men had to use all their power to effect a delivery by this means; however, after considerable twisting and turning of the foetus and great traction the delivery was effected.

In passage almost all the hair and skin came off, so badly putrefied was the foetus. The foetal membranes and the cotyledons were all in a liquid state, and came away readily as soon as calf was extracted.

After delivery the cow immediately began eating hay, but I have not heard whether she lived. I was inclined to give a fatal prognosis due to the putrefying of the cotyledons, allowing absorption of fluids through the wounds thus caused. Of course, the womb was well irrigated, which may have assisted somewhat in preventing septicæmia.

I have never before seen or heard of a case like this, and would be glad to learn from the readers if anyone has seen a similar case.—*American Journal of Veterinary Medicine.*

A NEW VETERINARY SCHOOL IN ITALY.

THE project to establish a veterinary school at Padua has been well received by the University Senate, the Provincial Council, and the Agricultural Societies. In view of such an institution those interested have reminded the authorities that it would simply be the renewal of a tradition, which dates back to 1765, with the foundation of a Chair of Veterinary Medicine, which was suppressed when Padua fell under the Austrian domination. Even before that date, however, it would appear that the veterinary teaching at Padua was more apparent than real, according to our Paris contemporary, the *Revue Générale de Médecine Vétérinaire*.

Translation.

THE WAR AND APHTHOUS FEVER. DR. ENRICO CONTI'S REMEDY.

ABSTRACTED BY I. S. C.

THE experiences and observations of the famous Italian veterinarian, Dr. Enrico Conti, are especially interesting at the present moment in view of the epidemic of apthous fever, which is reported to be spreading among the cattle of the concentration camps around Paris.

The disease has not only invaded France, but it has also established itself in East Prussia. This misfortune for the enemy was noted by Schütz, in an address which he recently delivered in Berlin as one of a series of the so-called "War lectures."

The lecturer explained that the Russians had taken possession of the cattle in the territory which they at first occupied in East Prussia; but, being subsequently defeated by Von Hindenburg, they were forced to make restitution of their plunder.

The captured animals were returned, but in the meanwhile they had contracted apthous fever. Thus the complaint is now epidemic in East Prussia as well as in North-western France.

The lecturer referred to the expenditure of 2,600,000 marks in 1912, the handsome sum which was paid in compensating owners for compulsory slaughtering of infected or suspected cattle. The most drastic measures were employed to ensure success in the strenuous effort then being made to stamp out apthous fever in Germany: yet there it arrives again by the fortunes of war!

Indeed, it is by such side issues as disease among animals and troops—with or without scarcity of food—that military matters are frequently determined. Hitherto, however, a strict impartiality seems to have been observed as between the belligerents, at any rate in the equal distribution of animal disease. The fickle goddess of fortune just now is showing a neutrality quite Italian. Therefore, the discoveries of Italian veterinarians can be made use of by either side—or by both—for it is to the mutual advantage even of enemies to eliminate as far as may be the incalculable chances of widespread apthous infection from a warfare which is more terrible than enough already.

In *La Clinica Veterinaria* of January 15, Dr. Enrico Conti urges veterinary practitioners to fight malignant apthous fever by adopting his plan of dealing with the scourge, because he has found it to be the most efficacious of all the measures that he has in turn adopted. At the same time he warns his colleagues against the least carelessness in the method of carrying out the operations which he recommends, because so much depends on the way his instructions are followed.

He says that every other sort of treatment had been tried with very little success in combating the unprecedented virulence

of the 1913 outbreak of malignant aphthous fever in Italy. Undoubtedly the best treatment proved to be that of intravenous injections of an isotonic solution of bichloride of quinine. Other kinds of intravenous injections had previously been tried unsuccessfully, including various preparations of silver (zimargol, protargol, &c.), which are supposed to be specific against infection in general and aphthous fever in particular, but the terrible mortality could not be checked. At one time it was as high as 80 per cent. in certain districts, and in the most favoured places it never sank below 30 per cent.

Such an epidemic had been previously unheard of within living memory, and naturally no stone was left unturned in fighting it. All possible remedies, both local and general, were tested with the double purpose of maintaining the function of swallowing among the victims and of destroying the teeming bacteria which necessarily characterize the disastrous malady itself, but which flourished inordinately at that particular period as a consequence of the dry fodder which is always inevitable during the winter season.

In the midst of his dishearteningly futile efforts Dr. Enrico Conti heard that the eminent Professor Domenico Bernadini, Director of the Surgical Clinic at the Veterinary School of Parma, had obtained good results during a former outbreak of aphthous fever by means of intravenous injections of quinine. Dr. Conti anxiously hastened to consult the professor with regard to these previous experiments, and, being greatly encouraged, he decided to adopt the treatment in question.

In the course of his own experiments with the quinine injections Dr. Conti found it necessary to modify the original method of procedure. This, though most clever and scientific, proved to be somewhat impracticable. It was, above all, important that the treatment should be brought within the resources of all ordinary practitioners, so a process had to be initiated which should be as simple as compatible with efficacy.

The method adopted by Conti is thus described by himself:—

"I used a scrupulously sterilized glass syringe holding 20 c.c. I disinfected the skin with iodine, having first shaved the animal's neck, round about the jugular vein, where it was to be penetrated.

"I inserted into the puncture a little tube, which, at the right moment, I entrusted to an assistant who knew how to draw it forward in a particular manner when I introduced the syringe and to let it go back when I had made the injection.

"I was always careful to allow a little blood to escape before introducing the solution.

"The amount of the injection varied from 20 to 60 c.c., according to the circumstances and age and sex of the patient. For instance, I injected 20 c.c. into heifers up to about 18 months old, and 30 c.c. into steers over 18 months, and 60 c.c. into bulls.

"As I always operated with proper precautions I never had to regret the least mishap, to say nothing of the more serious consequences which were generally prognosticated; among these

the alarmists anticipated phlebitis, thrombosis, and the introduction of air into the veins.

"Most certainly it is necessary to take care that the liquid should entirely pass into the jugular vein. If this is effected no local reaction will supervene. If, however, some drops should escape into the subcutaneous cellular tissue there will be some slight induration or ecchymosis—at the worst a temporary local disturbance of no consequence, which will give way to subsequent suitable treatment.

"I have observed that animals do not appear to suffer from any after-effects in consequence of these inoculations, excepting only in case of the injection being made a little too rapidly; then the patient might be affected with vertigo and might even fall, though without alarming symptoms or fatal consequences. Such accidents can be avoided by due care in pushing home the piston of the syringe with the utmost slowness."

Having given this warning Dr. Conti supplies a circumstantial list of his inoculations and their results. This shows the number of inoculated animals during three months to be 258 with twenty-nine deaths.

He considers that this average, of about 11 per cent., is sufficiently gratifying, considering the previous mortality in that disastrous epidemic, and remembering the fact that many of the patients were already gravely affected before they could be inoculated. He asserts that recovery was in direct relation to the time which elapsed between infection and inoculation.

Dr. Conti very modestly draws the attention of his colleagues to the results of his labours, which, as he says, prove the efficacy of the means he employed. In his opinion nothing better has been discovered up to the present. At least, the death-rate in malignant aphthous fever can be considerably diminished by the treatment advocated.

Not even this can be urged in favour of other measures which had first been tried; so, with all deference to the veterinary profession, the writer recommends that in all cases of malignant epizootic aphthous fever bichloride of quinine should be relied on, and should be administered in the manner and doses which he has found to be so efficacious.

It may be useful further to note the special prophylactic measures which were adopted in his own commune by the advice of Dr. Enrico Conti.

As a protection against infection from neighbouring communes, which were more than ever ravaged by the disastrous disease, sanitary cordons were instituted. These were served by ordinary citizens under the direct command of the communal guard.

These special constables, being furnished with distinguishing badges, had to patrol the roads of communication night and day, and before allowing anyone to pass into their own commune (of Busseto) had to oblige all newcomers to dip their boots into a vessel containing a creoline solution. Carriages and horses had to pass over a prepared tract of quicklime, in order to prevent

as far as possible the importation of the aphthous virus, which is known to be so easily diffused.

No such measures can be absolutely infallible, but these precautions certainly helped during that unhappy period to keep the deplorable disease within certain definite limits where it could be treated. Thus therapy must always be allied with prophylaxis. All hygiene teaches us to lay to heart the maxim: "Prevention is better than cure."

Correspondence.

THE WAR AND THE PROFESSION.

The following letter has been received:—

MY DEAR R—,—After seeing you the other day I returned in due course from my leave. I came over on the night of February 21, and the submarine scare was at its height and the crossing might almost be described as exciting.

Arriving at Folkestone at 8.30 p.m., I just had time to get aboard and off we went, leaving at 8.40. With all lights out we steamed into the night; the weather was perfect and the sea like a millpond—just the night for periscopes. The passengers were all officers, and a lot of us came from the same part of the line, so we stayed on deck and discussed the situation in preference to going below. One could see and be seen for a considerable distance, so everyone had the "periscope look." There was, of course, a fair amount of risk; but all the boats were swung out, so that even in the event of an attack there was not any great danger. Personally, I had already bathed and was not anxious for a cold bath. We were going along at a great "bat," and a torpedo would have had to be pretty slippery if it intended to catch us, so we eventually decided to demolish supper. In the saloon things were quite gay and lights burning bright, as all the portholes were below the water-line, so we did ourselves well. All of a sudden a bell rang and we saw the watertight doors at the end of the saloon slowly closing and conversation stopped dead. It quite gave one the falling of the tummy feeling, but we were all reassured when the steward informed us that they were only seeing that the mechanism was in order, as we were nearing an awkward spot. The searchlights from the battleships were sweeping round in lazy circles and the Calais light brightly burning well to our port. In a few minutes we steamed into Boulogne Harbour, not at all sorry that the crossing had been safely negotiated. I set foot on shore at 9.45, the quickest passage I have ever made across Channel. Luckily I found a car waiting for me, and I think there was more risk driving fifty miles through a land fog at 20 miles an hour than there was dodging submarines. However, I was snugly in my billet, five miles behind the firing-line, before 2 a.m., so had nothing to complain of; my less

fortunate friends who came by train not arriving until 7 a.m. the next day. The regiment left next day for the trenches, our people having to occupy a new trench a few yards behind the hole out of which the 16th Lancers were so unfortunately blown. The horses on this occasion did not go up, so that I was left in peace at our little "willage."

During the absence of the regiments the Army Veterinary Corps saw a good deal of each other, and we had quite a round of little dinners; but time hangs heavily, and we were all pleased to see our respective regiments return.

The casualties of the 11th were, fortunately, light; we had 1 officer badly hit and 4 slightly, 4 men killed and 14 slightly wounded. As usual, we are all awaiting orders for a move to any other climate than this.

As regards veterinary work, we are in the happy position of not being overworked with cases, as we find preventive precautions save a lot of sickness. In our brigade it is not usual to have more than about 35 animals under treatment out of the 600 odd in each regiment, and considering that all these cases could move off with the regiment, I consider this quite satisfactory.

The cases are various, comprising kicks and their accompanying wounds, cracked heels, frost-bites, picked up nails, laminitis, an occasional case of pneumonia, and, even less frequent, a case of colic.

The practice one sees is useful in that owing to the presence of a lot of knowledgeable farrier-sergeants, &c., one's diagnosis has to be quick, emphatic, and correct. I come across quite a number of Army Veterinary Corps men in my country jaunts, and I do not think there are many who will be sorry when this campaign is over.

A war is a great meeting-place and one meets friends from all parts of the world. I expect you are interested in the Singapore riot. I knew the 5th Punjabi Regiment well, and all of the officers who were killed. I do not attach any political significance to the outbreak, as it is a thing which could have happened in peace time. The general bearing of the men of this regiment never impressed me, and, although sorry to hear such bad news, I cannot say that I was at all surprised. However, I expect we shall both receive a full account of the happenings. Must now close.—Yours,

S. H. L. W.

THE FRENCH MILITARY VETERINARY SERVICE.

Two thousand French veterinary surgeons have actually been mobilized. No less than 1,000 are at the Front, and several have already fallen gloriously. Among these may be mentioned the following:—

Vétérinaire aide-major de 2e classe de réserve au 8e hussards, Dacier, killed on September 9, 1914.

Vétérinaire aide-major de 1re classe de réserve au 40e régiment d'artillerie, Devoge, wounded October 7, 1914, at the action of Croix-sur-Meuse, died on November 8, 1914, at the Military Hospital at Verdun.

Vétérinaire aide-major de 1re classe au Quartier-general du 14 corps, Vanney, killed in an automobile accident on military duty.

Vétérinaire-major de 2e classe au 6e régiment de chasseurs, Hans, killed on January 31, 1915.

Vétérinaire-major de 1re classe au 35e d'artillerie, Chaulet, shot.

Vétérinaire aide-major de réserve au 13e hussards, Berthélemé, killed on August 26, 1914, in Belgium, and buried by the Germans.

Several of our French colleagues are missing, and others are amongst the military prisoners taken by the Germans.

The following names have been specially mentioned in dispatches:—

M. Audit, Veterinary-Major of the Second Class, 3rd Regiment of Artillery, for having shown remarkable energy and coolness in the face of the enemy, and having saved a number of gun carriages from capture.

M. Ricquier, Veterinary-Major of the First Class, 4th Cuirassiers, for having shown remarkable determination and courage during an attack on a convoy, and for having assisted in the escape of the same.

M. Lambert, Principal Veterinary Officer of the Second class, for his admirable organization of the Horse Depôts.

Reviews.

Bibby's Book on Milk. Section II. The Law relating to the Sale of Milk: its History, Criticism of its Administration, and Suggestions for its Amendment. Published by J. Bibby and Sons, Ltd., Feeding Experts, Liverpool. 1914. Price 4s. net.

This book is full of information concerning the difficulties dairy farmers undergo in keeping up the standard quality of their milk. It has been produced largely through the efforts of Mr. John Hanley, F.I.C., F.C.S., the laboratory manager for Messrs. J. Bibby and Sons. The principal facts in connection with the analysis of milk sent by customers to the firm have been carefully tabulated.

There is a very complete record of milk cases in which a few of the law's decisions, and many of the magistrates' judgments on milk standard points are given. There is a distinction with a difference between the two classes of decisions. We are inclined to think that the dairyman and farmer would suffer less if his case could always be brought either before a stipendiary magistrate or one of His Majesty's judges. Dairymen and milk sellers would be subject to considerably fewer miscarriages of justice and faulty judgment if more farmers served on County Councils and other public bodies, and if agricultural matters were adjudicated on by men having a technical knowledge of the question under consideration. To a mere layman, however, it has always seemed an easy matter to administer the law on the subject as applied to the standard quality of milk if the two decrees thereon are read and interpreted literally. For the defendant to prove, by weight of acceptable evidence, that even if his milk is below standard, yet, nevertheless, *it is genuine* and just as obtained from the cow, ought to ensure his acquittal. The law, interpreted literally, is simple enough to understand; but a perusal of the history of the cases recorded in the book will show the reader what a fallacious view it is to assume that it will be so interpreted. The explanation a respectable milk seller has to offer for a lapse on the cow's part, and the calling of his attention to the analyst's report, unless the case is an absolutely fraudulent one, would appear to meet requirements, and perhaps do more good than haling every peasant, whose cow has failed in her supply standard, up in a court filled with the flotsam and jetsam of humanity.

The book contains copies of the Sale of Food and Drugs Act, the Dairies, Cowsheds and Milkshops Order and Regulations, Tuberculosis Order, and Board of Agriculture and Local Government Board Regulations concerning preservatives in milk and cream.

The volume is an interesting and instructive one. The philosopher with a broad mind could decide milk cases equitably if he

took to heart the lessons to be learnt from a perusal of its pages. Those veterinary surgeons who wish to spread reliable information on the legal aspect of the milk question as it affects the cowkeeper and dairymen cannot do better than recommend this "Book on Milk" to their clients. G. M.

The International Institute of Agriculture: its Organization, its Work, and Results. Published at the Printing Office of the Institute in Rome. 1914.

At a time like the present we are apt to forget that "Peace hath her victories no less than War." "The existence of the International Institute of Agriculture is a fact really unique in the history of the world. The object of the work of the Institute is to defend and promote the agricultural interests of the entire world." Forty Governments and fifteen States and Colonies have given their adherence to the principles and objects of the Treaty as formulated at an International Conference held in Rome on May 28, 1905. The objects of the body as defined in Article 9 of a Treaty that has been drawn up are, shortly, to collect, study, and publish information concerning farming, vegetable and animal products, and markets, indicate the wages paid for farm work, make known the new diseases of vegetables and the remedies, study questions concerning agricultural co-operation, and submit to the approval of the Governments concerned measures for the protection of the common interests of farmers.

The General Assembly has met four times. The library of the Institute contains 33,000 volumes and 28,000 pamphlets.

One of the most important subjects at present being studied is land reform and the formation and maintenance of homesteads. The movement owed its inauguration to H.M. Victor Emmanuel III and to Mr. David Lubin, a citizen of the United States.

The publication is printed in the English language, and is well worth perusal by all those who appreciate the value of organization and co-operation in what should be the premier industry of every country.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably type-written—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.

THE VETERINARY JOURNAL

MAY, 1915.

Editorial.

THE ARMY VETERINARY SERVICE.

THE *Daily News* for March 22 contains the following interesting and welcome announcement:—

The Under-Secretary of State for War, answering a letter addressed to him by Sir Clement Kinloch-Cooke, M.P., on the position of junior officers in the Royal Army Medical Corps, wrote: "I am glad to be able to inform you that it has now been arranged that all the lieutenants in the Royal Army Medical Corps should be promoted captains." We congratulate the doctors on having attained some measure of success in their efforts to secure better rank and more pay in the Service, but we question even yet whether the favour granted is as pliable as it ought to be. At any rate, we can conceive of not a few men joining the Royal Army Medical Corps at a marked disadvantage. It was quite an anomaly that professional men doing expert work for their country should only have been granted such a minimum rank on joining the Army as that of lieutenant. In all walks of life experience and technical ability, if worth anything, produce their reward. The bank clerk becomes in time a bank manager or the head of a department, the midshipman becomes a mate or captain, the curate reaches a vicar's, rector's, or dean's position, the devotees of the sock and buskin attain the star actor's or actress's pedestal or the principal parts in the dramatic fare, and even in ordinary industrial circles the carter may become a head horseman, the groom a coachman, the piecer a minder, and the navvy a foreman. Any such men or their like, if requested to go back to their original positions and pay, would resent the

demand and be justifiably dissatisfied with their recompense and status. The majority of them would have gained their places by merit, industry, and perseverance, and, naturally, little goodwill or regard would exist towards those who had again placed them in inferior positions. They would always be men with a legitimate grievance, and no class of individuals of this description ought to exist long in a well-governed State.

The treatment of horses wounded on the battlefield, the care of equines in camp and on the march and their maintenance in health, is no less essential to the effectiveness of military operations than the care and treatment of soldiers fighting in their country's cause. If justice is to be done, the best results obtained, and the least present and future suffering avoided, all of which are necessary in really well-managed operations, then those veterinary surgeons who have left good positions in civil life to take up arduous and important duties in military spheres should have adequate recompense, and as near as possible equal social rank and position to that which they formerly enjoyed. The individual himself should not be penalized because he has willingly and courageously answered his country's call; the wife and children at home should not suffer because the head of the house has done his duty, or perhaps more than his duty.

No deserving country ought to permit such a lapse, and no paternal Government that desires to do right—and in many things this Government has so desired—will rest satisfied with the display of such a marked handicap on loyalty. Much cant has been talked by those living on warm hearthstones about patriotism, and with many it seems to be taken for granted that an unwritten law demands that those employed in the relief of their country's human or animal suffering should never consider such material things as pay and position. To this misapprehension of human ethics and right-mindedness we would reply that no body of men is ever likely to do justice to its calling and entourage unless it is adequately and proportionately rewarded.

A Member of Parliament is now considered to be worth £400 a year, and he receives it; and we consider that the lowest paid veterinary surgeon engaged at the present time wholly in his country's service ought to be worth quite this amount, and that there should be no bones made about paying it to him and

letting him have it *as a net amount* without any deductions or uncertain additions. Men of experience in their profession who have left lucrative practices, and who are mature or middle-aged, should not be obliged to join the Army as lieutenants, but given rank and pay commensurate with their years of technical service in civil life and their sacrifices. Their duties are vital, directly and indirectly, to the welfare of the campaign, and if "broke in the wars" a grateful country should make their days of darkness as pleasant as possible, and certainly they should not end them in poverty, obscurity, and oblivion.

The only way to remedy the defects now existing in our case is to keep pegging away at those in authority, and the medical profession has shown us how they have achieved their step forward.

G. M.

CERTIFIED CLINICAL WORK

In any branch of science a combination of theory with practice is necessary to produce a finished result. The application of theoretical knowledge to the puzzles which disease presents is requisite for their solution. One prominent aim of a good veterinary surgeon should be to become as perfect as possible in the application of acknowledged truths and laws. Applied science joined to the requisite proficiency in the art of his practice will enable him to take his proper position in the ranks of a profession which ought to be both learned and skilled. We lay some stress on the quality of learning because there is a tendency to omit a consideration of it by the lay public in summing up our calling, and a doubtful sort of recognition of it also among the members of other learned professions, whilst even in our own ranks we question whether this desirable attribute is always given the prominence it deserves and ought to have. Without a modicum of skill we shall, of course, not travel far in our chosen vocation, but mere deftness often assumes an inflated value when not backed up by adequate reasons for its exercise, and occasionally its display is of too stagey or theatrical a nature altogether, the object being to create an impression rather than to achieve a result.

It will have been generally noted that the question of what has hitherto been known as "compulsory pupillage" has once

more come to the fore. There has always been a tendency to retain old names in our profession, and in this case the rose of "compulsory pupillage" would assume a much more pleasant aspect if another title was substituted for it. Anything "compulsory" is resented by the average Briton, and the need for compulsion should have passed by the time a man is associated with a veterinary college, while "pupillage" suggests boys' and girls' schools, or academies for demure young ladies and budding young gentlemen. "Obligatory tuition" sounds and reads better than "compulsory pupillage." The embryo collegian will have passed the pupil's term and be gifted with qualities of mind and body beyond the pupil stage. If he is to be a fit recipient for veterinary knowledge he will be an intelligent, well-educated youth, possessing a good groundwork of general information. We suggest that under these circumstances a too personal designation given to him, suggesting that he is an irresponsible biped, such as that indicated by the name of "a compulsory pupil" is both unnecessary and undesirable.

Of all satisfactory terms to notify what is in the minds of many of us perhaps "certified clinical work" is the best. We think each candidate for the diploma of the Royal College of Veterinary Surgeons should possess a certificate that he has done a certain amount of clinical work. The minimum of this amount can be formulated and tabulated by our governing authorities, and its maximum, together with the thoroughness of either, be taken into consideration by our examining board and tested by them when awarding marks or honours. No man will make a worse practitioner for gaining experience in clinical work, and many graduates will be benefited thereby.

We refrain from indicating when a man shall obtain experience of this kind, because we know how individuals differ in temperament, proclivities, and receptivity, but we think the period may very well be left to the developing clinician himself, who is supposed to be acquainted with the two adages: "Man, know thyself," and "Worth makes the man, the want of it the fellow; the rest is merely leather, or prunella." We are quite in agreement with the argument that experience gained in *two or three* satisfactory practices is better than a time of probation with *one* tutor. We adopted this method ourselves and have never regretted it. Many reasons could be given for its utility and beneficial effect.

With regard to the subjects in which it is desirable for the would-be practitioner to acquire knowledge we can foresee a difficulty in some matters. Experience in parturition cases is not easily acquired nowadays. We have acted as assistant and *locum* in several practices situated *entirely in the country*, and yet have not attended above three or four difficult calving or foaling cases in a year, and if we had been at college we might have missed even these. The tendency with these operations is for the veterinary surgeon to be called in less and less, and where young men live on farms that are well managed the veterinary surgeon may often say good-bye to this class of work. Again, there are other clinical operations that ten men will be able to see where twenty will not. If certified clinical work is made a *sine quâ non* for the diploma, it cannot be expected that every candidate for it will have equal experience in all classes of work.

Much has been made in some quarters about the superiority as raw material of the country-bred man over the town-reared one. As a matter of fact, we do not believe there are many entirely country-bred men in our profession. We can name many instances where the town or city brought up product can give the countryman a start both in intelligence and adaptability; in fact, we know not a few men equal to any in the profession as experienced and expert practitioners whose homes and surroundings have been of the town and city description. Some of our very best veterinary surgeons have been the offspring of parents who kept a small dairy and a stable of horses within the confines of a town or city. The mind moves quicker and on more modern lines in a place where wits are sharpened by contact with other wits than where intelligence is often at a discount among one's entourage. The benefits of "certified clinical work" will certainly be great for the whole future of the profession. There is no such thing as a standstill position. If we do not progress we shall deteriorate. If the suggested plan becomes an accomplished fact it will react favourably both for the practitioner and the collegian. The latter will be getting right guidance and direction, and need not lay himself open to the charge of being a diploma-holding inefficient; the would-be graduate will know whether he is obtaining the necessary clinical experience or not, and can suit his actions accordingly; the tutor will recognize what instruction he ought to give to his charge, and probably endeavour to fulfil his obligations, and the bottle-washing surgery-cleaning, carbolized oil, caustic clam and disproportionate pharmacy denizen era will gradually disappear for ever from the list of the supposed requisites of junior aspirers to the ranks of a learned profession.

G. M.

General Articles.

OPHTHALMIC MALLEIN FOR THE DIAGNOSIS OF GLANDERS.

By JOHN R. MOHLER,
Assistant Chief of Bureau,

AND

ADOLPH EICHHORN,
Senior Bacteriologist, Pathological Division.

THE OPHTHALMIC MALLEIN TEST.

DURING the last few years the ophthalmic mallein test has gained great favour in the diagnosis of glanders. The popularity of the test is rapidly gaining wherever it has been applied, and among its supporters we find at the present time the greatest authorities on the subject of glanders and on clinical diagnosis. This method of testing is at present officially recognized in Austria, and the indications are that ere long it will constitute the official test in other countries. The results obtained in Austria, where the test has been employed for several years, are very gratifying, and Professor Schnurer, of that country, one of our greatest authorities on glanders, claims that the control of the disease can be very satisfactorily carried out by the application of the eye test, supplemented in doubtful cases by the agglutination test. Bavaria has recently adopted this method of diagnosis for official testing. In Germany the method is also gaining in favour, and current veterinary literature contains expressions of satisfaction with this test from many German authorities. In the United States the Bureau of Animal Industry, in consideration of the favourable results obtained, has recognized this method of diagnosis for interstate shipments of equines. The test has also been officially recognized by the Canadian authorities, and thus far no sanitary official connected with any of the States in this country has declined to approve this test.

The favourable results which have been obtained with this diagnostic method can no longer be denied. Its practicability is apparent, and its use in the control of glanders appears to be now an absolute necessity.

Simplicity of Procedure.

The ophthalmic test has a great advantage over others because of its very simple application. It may be readily executed by any veterinarian, and its other advantages are that the results are obtained in a comparatively short time, and are, as a rule, distinct and definite. The simplicity of its application is plainly manifest when compared to the subcutaneous test, as it is only necessary to drop two or three drops of concentrated mallein into one of the eyes of the animal to be tested, or, by a still simpler procedure, to dip a camel's-hair brush into mallein and introduce this into the conjunctival sac of the animal. The reaction usually commences in five or six hours after the introduction of the mallein, and lasts from twenty-four to thirty-six hours. A positive reaction is manifested by a purulent secretion from the tested eye. This may be very profuse or slight, sometimes associated with a severe conjunctivitis and oedema of the lids, and at other times without any inflammatory symptoms being present. At times only a very small quantity of pus may be present in the inner canthus of the eye. At other times the reaction may manifest a true pyorrhoea.

The reaction manifests itself in varying degrees in the animals, but the intensity of the reaction has no relation to the extent of the disease in the reactor.

Reliability of the Test.

The available data on the ophthalmic mallein test are sufficient to draw conclusions as to the reliability of the method, and in Austria alone it has been applied in many thousands of cases with uniformly good results.

In considering the good results obtained and the advantages of this method of testing, a concentrated mallein has been prepared for this purpose by the Bureau of Animal Industry, and this was made available to a number of practising veterinarians who desired to give this method of testing a thorough trial. It has also been employed by inspectors of the Bureau of Animal Industry in their field work, and reports are accessible regarding its action for diagnostic purposes in more than 18,000 cases. The results from all sources were uniformly satisfactory. Practising veterinarians who have given this method a trial have

reported very favourably on the results, and the tests conducted by the bureau inspectors on several thousand animals were also satisfactory. The method has been applied here in Washington whenever possible, and recently in some immunizing tests of glanders conducted by the Bureau of Animal Industry there was a good opportunity to repeatedly employ this test. In all these instances the results were uniformly good. In cases of glanders there appeared a marked purulent conjunctivitis, and the reaction at times was so severe that the animal could not open its tested eye.

Best Results with Raw Mallein.

The essential factor in obtaining satisfactory results from the test appears to be in the use of the right kind of mallein. It must be by all means a concentrated mallein, and apparently the best results follow the use of raw mallein, which, as a rule, represents the mallein obtained after the concentration of the filtrate from the bouillon cultures of the glanders bacilli. The ordinary mallein used for subcutaneous testing is not adaptable, and the failures which have been reported in the literature were without doubt, in the majority of cases, due to the fact that the mallein employed was not sufficiently concentrated. Marioth* correctly asserts that the reaction does not depend as much on the quality and quantity of the mallein as on its concentration. Our experiments in preserving such mallein with the ordinary quantity of 0.5 per cent. carbolic acid showed that it does not interfere with the results of the test, although the lachrymation which follows immediately after the introduction of such mallein is more profuse than when carbolic acid has not been added, but this disappears within one or two hours after the application of the test.

Preparation of the Mallein.

The concentrated mallein which has been used for our work, and which gave such satisfactory results, was prepared at the request of the authors by and in co-operation with Mr. A. M. West, of the Biochemic Division, as follows:—

The media consists of bouillon containing 5 per cent. glycerine, 1 per cent. peptone, and 5 per cent. NaCl. The reaction is that of the natural acidity of the meat, no acid or alkali being

* Monatsch. f. prakt. Tierheilk., Bd. 24, Hft. 7/8, pp. 340-373; Hft. 9/10, pp. 426-456, Stuttgart, 1913.

added. The flasks of media are inoculated with virulent cultures of *Bacillus mallei*, and placed in the incubator at 37·5° C. for a period of two months or more. The stock cultures of *B. mallei* are kept on agar, and their virulence is renewed when necessary by passage through a series of guinea-pigs.

The well-grown cultures show a heavy mass of organisms, which generally sink to the bottom of the flask. This growth is of a whitish colour spotted with brown. The cultures are then removed from the incubator and heated for one hour in the Arnold sterilizer. Then they are stored for two weeks in a dark closet to settle. The clear liquid is then carefully decanted, and the growth proper is discarded.

A measured amount of the decanted liquid is concentrated over a steam bath to one-third its volume. It is then filled into flasks and sterilized and again filtered while hot, first through one, then through three paper filters. Next the clear liquid is passed through a Berkefeld filter. This is followed by a concentration to one-tenth its original volume and by sterilization.

To the raw mallein, concentrated to one-tenth its original volume, is added 0·5 per cent. carbolic acid and 20 per cent. glycerine. Then the liquid is again concentrated to one-tenth its original volume, filtered while hot through filter paper, and sterilized. It is kept in a dark place for a week, and if upon inspection a precipitate is found the mallein is again passed through paper filters and sterilized. The finished product is a clear, sirupy, dark-brown liquid, with a disagreeable odour. The mallein is then bottled, under aseptic conditions, in small phials, and is ready for use.

It is advisable to provide the mallein for the tests in small phials, each containing about 1·5 c.c. of mallein, which is sufficient for testing fifteen horses. After the phial has been opened and part of the contents used for testing, especially if the mallein has been taken out with a camel's-hair brush, the remainder should not be used for tests applied on subsequent days, but should be discarded.

The use of Dry Mallein.

Another form of mallein which has been used quite extensively for the eye test is the mallein siccum, or dry mallein. This represents an alcoholic precipitate of mallein. It is a fine grey

powder, and must be dissolved in water before it is used. The solution loses its effectiveness in a very short time, and must be prepared fresh on the day of the test. Dr. K. F. Meyer, formerly of the University of Pennsylvania and now of the University of California, has used the dry mallein extensively, and at the present time this preparation is employed in Pennsylvania for the application of the ophthalmic test. For this purpose two phials are sent out from the laboratories of the Pennsylvania Livestock Sanitary Board, one containing the powdered mallein, and the other sterile or saline water in quantities which will make a 5 per cent. solution of mallein. The contents of the bottle containing the fluid is poured into the bottle containing the mallein powder, and the test solution is thus prepared. The results with this form of testing in Pennsylvania appear to be highly satisfactory, as may be seen from a publication by Dr. Meyer on the "Conjunctival Reaction for Glanders," in the May, 1913, number of the *Journal of Infectious Diseases*.

The advantages of the use of one as compared with the other of these forms of mallein for the eye test are not marked, as equally good results were obtained from the application of both forms of this product. The fact that the preparation of the raw mallein is less laborious and expensive than the mallein siccum, and that it is ready for use on opening the phial, would probably give this product a greater popularity. It is only natural, however, that in the event of subsequent extensive testings showing the superiority of the dry mallein, it will be given preference over the raw product.

Method of Applying the Test.

Before the application of the ophthalmic test the animals should be carefully examined to ascertain whether the eye shows conjunctivitis or other changes which are associated with supuration. Should such be present the test should not be applied.

The test consists in introducing into the conjunctival sac of the eyes several drops of either undiluted raw mallein or a solution of precipitated mallein (0.1 to 0.2 c.c. per horse). This may be introduced either with the aid of a camel's-hair brush or with an eyedropper. Only one eye is treated; the other serves as a control for comparison of the reaction. For the testing of horses in the same stable the same dropper or camel's-hair brush may be used for all the animals.

The results of the test should be recorded as follows:—

N=Negative—eye unchanged.

S=Suspicious—seromucous discharge.

P +=Positive—seromucous discharge with purulent flakes.

P ++=Positive—distinct purulent discharge.

P +++=Positive—purulent discharge with swelling of the eyelids.

P ++++=Positive—strong purulent with swelling and gluing together of both lids.

Effect of the Test on Glandered and Healthy Animals.

As soon as the mallein is introduced into the eye practically all animals show a lachrymation, increased reddening of the con-

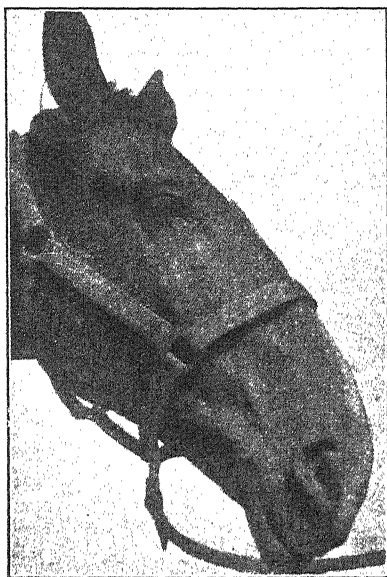


FIG. 1.—P += Seromucous discharge with purulent flakes.



FIG. 2.—P ++ = Distinct purulent discharge.

junctiva, and slight photophobia. No significance should be given to these symptoms. They disappear in one to two hours.

Glandered animals are hypersensitive to mallein in a way that the administration of small quantities of mallein produces local inflammatory processes. In larger quantities it produces a febrile general reaction. The hypersensitiveness appears as a rule during the third week after the infection, and reaches its height

in the first few months after the infection. In the subsequent course it may subside in retrogressive cases even to the degree observed in healthy animals, but even in these cases various conditions may bring on an increased sensibility.

The characteristic manifestations of the reaction for glanders commence as a rule in from five to six hours and last twenty-four to thirty-six hours, sometimes longer. The reaction consists of a purulent discharge from the conjunctival sac, which is typical, as well as swelling and gluing of the eyelids. It is advisable to examine the tested animals in a good light from twelve to twenty-four hours after the application of the test. Varying degrees of reactions are illustrated in Plate I, figs. 1 to 4.

A suppurative discharge of varying quantities is considered a positive reaction. The conjunctiva and the eyeball should also be included in the examination after examining the discharge. A pseudo-reaction can be produced by artificial or accidental irritation of the eye. On the other hand, the purulent discharge may have been removed (either by the stable attendant or by the animals licking each other, &c.), and the positive result thus obliterated. In such cases dried pus may be frequently found on the parts around the eye.

Generally the positive ophthalmic reactions are not accompanied by fever or systemic disturbances. Occasionally, however, affected horses are hypersensitive to such a degree that even the few drops of mallein placed in the eye may enter the circulation and produce fever. Therefore it is advisable, when possible, to accompany the ophthalmic reaction with temperature readings. For this purpose the temperature should be taken twice, the first time when the eye test is being made and the second time when it is judged. In a doubtful eye reaction, where there is an increased temperature of $1\frac{1}{2}^{\circ}$ F., the test should be considered positive if the animal had a normal temperature at the time the test was made. As stated before, it should be remembered that the intensity of the reaction has no relation to the extent of the disease in the animal tested.

In the absence of any secretion the test should be considered negative. When there is a mucous secretion or lachrymation during the period of reaction the test must be considered as atypical, and in such cases it may be repeated the same day, when, as a rule, the results are more confirming.

The application of the ophthalmic test should not be repeated more than three times on the same animal within three months, as experiments show that the reaction after the third application within this short period usually loses its intensity in positive cases, and on subsequent tests may be entirely absent. In cases where the results of the second test immediately following the first test are atypical, the blood of such animal may be drawn and forwarded to a laboratory for the serum diagnosis. From experience gained with the eye test such a procedure would become necessary

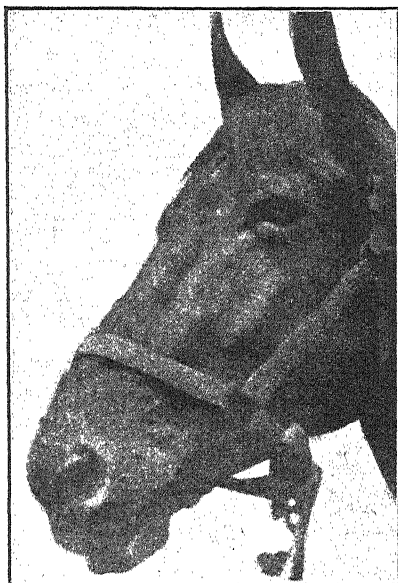


FIG. 3.—P + + + = Purulent discharge with swelling of the eyelids.



FIG. 4.—P + + + + = Strong purulent discharge with swelling and gluing together of both lids.

VARYING DEGREES OF REACTIONS IN THE OPHTHALMIC MALLEIN TEST FOR GLANDERS.

only in a comparatively few cases. In the control of glanders, animals may be re-tested every six months with satisfactory results.

REPORT OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION ON
THE OPHTHALMIC TEST.

The special Committee on the control of glanders of the American Veterinary Medical Association has issued a most excellent report on the various phases of diagnosis of glanders.

The conclusions on the value of the eye test offered by this Committee are in perfect accord with our findings, we therefore deem it advisable to include them in this paper, as follows:—

(1) The ophthalmic test not only meets all the requirements, but is without doubt the most convenient diagnostic method at our command.

(2) Its reliability compares favourably with any of the other tests available.

(3) The reaction is usually very distinct, and doubtful or atypical reactions are rather infrequent.

(4) The ophthalmic test has the advantage that it does not interfere with subsequent serum or other mallein tests if such are deemed necessary.

(5) The test may be repeated within twenty-four hours on same or control eye. If another re-test is necessary, it should not be made in less than three weeks.

(6) The ophthalmic test should be recognized by State and Federal authorities, since its reliability can no longer be doubted.

(7) In all atypical and doubtful cases of the ophthalmic test, the combined complement-fixation and agglutination or sub-cutaneous mallein test should be utilized for confirmation. Such a procedure would minimize the failure, and would assure the best results in the control of the disease in a single stable or in an entire community.

CONCLUSION.

The results achieved in Austria with the ophthalmic test have been remarkably successful and deserve the most earnest consideration. The report of Professor Schnurer on "The Results of the Diagnostic Procedure in Glanders in Austria" is a convincing proof as to the value of the eye test in the control of glanders. The senior writer received a communication only a short time ago from Professor Schnurer, and since it deals principally with the diagnostic value of the eye test, a quotation from the letter will no doubt be permissible:—

"I am at the present contemplating collecting the results of the eradication of glanders in Austria during the last three years (1910-1912). During this time 60,894 tests were undertaken on 47,973 horses. Of 272 cases which were found on *post-mortem* to be affected with glanders 240 (88.2 per cent.) were positive,

21 (7·7 per cent.) gave an atypical reaction, while 11 (4 per cent.) were negative. Of the 47,701 healthy horses, 189 (0·39 per cent.) were positive or atypical, the remaining 47,512 (99·61 per cent.) gave a negative reaction.

“According to these results, therefore, the eradication of glanders is only a question of organization—that is, the malleinization of horses at the border and conscientious following up of all suspected horses. Such procedure would, without doubt, result in a complete eradication of glanders. At the Veterinary School of Austria we now have difficulty in showing the student cases of glanders, and for demonstration purposes we are compelled to infect horses artificially, whereas several years ago we had every week at least one case of glanders in our clinics.

“I use as mallein at the present time a product which I myself prepare, which represents a bouillon filtrate from seven different strains of glanders bacilli which has been concentrated to one-tenth of the original volume.”

The optimistic view of Professor Schnurer is certainly justified from the results he achieved, and clearly shows that with proper organization in the control work of glanders the eradication of the disease is only a question of time.

The eradication of outbreaks of glanders cannot, of course, be altogether attributed to the eye test, since from the report of Nevermann, veterinary councillor of Prussia, glanders has diminished remarkably in that country, where they employ the combined complement-fixation and agglutination test for the diagnosis, while McGilvray has practically eradicated glanders from the Province of Manitoba by means of the subcutaneous mallein test. The method of testing by means of complement-fixation and agglutination is undoubtedly the most accurate of any available, but since it cannot be as conveniently applied as the eye test, its disadvantages are apparent. There is no doubt that with the application of either the eye test or the combined complement-fixation and agglutination tests, equally good results may be obtained, provided that the work is conscientiously carried out and that all the reactors are destroyed without hesitation.

As long as the authorities will limit themselves to the destruction of clinical cases only and will not take immediate action on reactors of the occult and latent character, glanders will not only continue to exist, but it will spread.—*Bulletin of the U.S. Department of Agriculture*, 1915, No. 166.

General Clinicals.

A PECULIAR SHELL WOUND.

BY LIEUTENANT E. H. WYLY.
Army Veterinary Corps.

At Ypres a number of horses were injured by a shell, and one case (that of a mare) brought to my notice was exceptionally interesting on account of the situation of the wound and the manner in which it had incised the piece of flesh.

The anus itself was completely excised, as perfectly as if it had been done by the surgeon's knife, whilst the tail, vagina, and buttocks were absolutely uninjured. The animal must have been in the act of defæcating when hit by the piece of shell.



This photo shows Lieutenant Wyly in the act of examining the wound shortly after the mare received it. Behind him is seen a brother officer who has since been killed.

There was no hæmorrhage at all, and this point is worth noting, and was caused by the fact that the piece of shell was very hot when it hit the horse. The horse lived for about four days, being eventually shot, and I recovered the piece of shell, which was about 3 in. by 2 in. from the region of the mammary gland. It must have deflected its course immediately upon entry. This animal had no other wounds anywhere on its body.

THE COURSE OF A SHRAPNEL BULLET.

BY LIEUTENANT E. H. WYLY.

Army Veterinary Corps.

At Ypres one of the horses of the 25th Brigade Royal Field Artillery received a peculiar wound from a shrapnel bullet, which is worth recording from the peculiar course it took.

We were sheltering from aeroplane vision by the side of a wood when a German shrapnel shell burst on percussion amongst the trees, killing four horses outright (all thoracic wounds) and wounding ten others, two of these latter so severely that I shot them immediately. Of the others, one had a bullet wound on the near side of the neck, just where one usually inserts mallein. It entered here and passed through to the other side as far as the skin and then became deflected downwards over the shoulder and along the thorax, leaving its course clearly demonstrated by a mark like the weal produced by the cut of a whip. By palpation I traced this up with my hand as far as the fourteenth or fifteenth rib, where I could distinctly feel the bullet rolling about subcutaneously, and from this situation I removed it with a scalpel quite readily.

Further progress was uneventful, and a careful search over the horse's body revealed no trace of wound elsewhere.

SPECIFIC CORONITIS IN THE HORSE.

BY F. C. MAHON, M.R.C.V.S.

Chiswick, London, W.

Definition.—In describing this condition under the above heading, we are following the lead of Mr. Malcolm, F.R.C.V.S., Birmingham. We may define it as a "chronic inflammatory condition of the keratogenous membrane," usually confined to that of the coronary cushion, the ergots, and chestnuts, but sometimes extending to that of the frog and sole, characterized by a malsecretion of the affected membrane similar to that observed in canker.

Causes.—The cause which we have indicated for canker, viz.,

a specific one, is in all probability the one operating here. Apparently there is a variance of opinion as to whether the disease is actually canker or not. We think, however, that the character of the secretion of the affected membranes, the appearance of the growths, the manner in which they react to the hot iron, the comparative absence of pain, and other points of similarity, point to the fact that the two conditions are actually identical. In other words, the cause is precisely the same, and the only point of difference is the alteration in the point of attack.

Symptoms.—Like canker, the disease is insidious in onset. In precisely similar manner the horn and, in this case, the skin of the coronet are underrun.

Later there is a partial shedding and fissuring of the undermined horn, and the exuding of the characteristic discharge in this case not so watery as that of canker.

In 1901, whilst acting for a professional friend at Nottingham, I encountered a case which I carefully watched and attended with good results. From notes compiled roughly, which I consider, or at least hope, still worthy of appearing in the columns of THE VETERINARY JOURNAL, and any imperfections in description overlooked by its many readers more scientific and learned than the humble writer, I put down what was written without alteration of language or embellishments of any description.

Subject.—An aged plethoric chestnut horse, the property of a leading Nottingham miller, constitutionally sound, a good honest worker. History does not reveal any illness worthy of note. Weather influences not of an extraordinary character. Local influences, wetting of feet, coronets, &c., not out of the ordinary. Farrier reported no injury by tread, nor did he ever recollect anything out of the ordinary, though he had shod the horse for years. My attention was first drawn to a supposed defect of the off hock, later the knees, then to a swollen, tender appearance, rather painful to the touch, of both fore coronets. I stopped him on the fourth day after primary examination and rested him a fortnight. When proceeding to town I left him in my friend's charge. The subject being of interest to me and uncommon in character can be proved by a letter of inquiry a year or more afterwards respecting the same horse. Its purport is: "That horse with so-called coronitis belonging to E—Bros. was, after a little further treatment, turned out to grass,

and although he was lame for two or three months he eventually became better, and has now been working for several months, and there is little or no indication of the trouble he has suffered from (April 27, 1903)."

A few hours after being eased from work the coronets of all four feet became intensely swollen, the action of the horse simulating when moved that of laminitis, and he stood occasionally in the attitudes too familiar to most practitioners.

A few days later on visiting my patient I found an eruption with sero-sanguineous discharge, and an evil smell proceeding from the boils. Later the exudation had an odour, and was



characteristic of "canker." The temperature became elevated; highest point 104.7 F. No symptoms of purpura or influenza were ever shown. I confess I was rather puzzled with the case. Referred to available works. The only account given by writers I perused was that of Professor Williams recording cases (Montreal), described, I believe, by Professor M'Eachran, and which Professor Williams designates as "*carbuncle of the coronary band.*"

My chief treatment after warm poultices was that of painting

the coronets daily with tincture of iodine, and occasionally the angry ulcerated surfaces and edges of the ulcers with perchloride of iron, bandaging same after surrounding parts with medicated cotton-wool to exclude air. Lowered diet. Gave internally liquor arsenicalis in drinking water. In food liquor potassæ iodidi. Finally, as a powder in food, pulv. nux vomica, gentian, and iron.

A careful examination of the lymphatics denoted nothing unusual. This I was very careful in doing, as glanders was reported at the time to be occasionally appearing in surrounding districts.

The soil upon which the stable was built, the food, and water supply were all carefully examined. I even had the water analysed, but no trace of animal or vegetable poisons was discovered.

Reading Messrs. Malcolm and Reeks's reports of "Specific Coronitis" now, I venture to consider this case the same, at least in the majority of its features. In later years I have met with identical cases as described by these able observers, in railway horses especially, and in cold weather.

Foot-rot in sheep one has repeatedly encountered, and inter-digital eczema in the cow, especially 1889-1890 whilst in a country practice, in which disease, as is well known, the eruption commences as in canker, either upon the solar plexus of the foot or in the inter-digital structures (Williams).

In foot-and-mouth disease separation always commences at the coronary junction (Williams).

The animal does not urinate inordinately. Urine analysis denotes nothing out of the common.

No particular foods have been relegated to the rôle of its causation (Williams).

In my case all four feet within a few days were affected. No constitutional symptoms save the febricula, which reached its acme seven days from the first visible coronal eruption. No other case approaching this had ever been encountered by local practitioners.

I think without cavil that Mr. Reeks's description of specific coronitis in his "Work on the Horse's Foot" is very lucid, and in my humble opinion coincides with the description of my case. Therefore, in adducing these long-hidden notes, taken hurriedly

in a busy practice, I venture to hope it will be one record of a class of case, not numbered by its hundreds, but only occasionally met with in an ordinary practice, although apparently encountered oftener in certain districts and veterinary practices, comprising low-lying damp soils in particular.

I should like to hear from THE VETERINARY JOURNAL readers of any cases occurring in London or suburban practices similar to those of specific coronitis as described by Mr. Reeks in his "Work on the Horse's Foot."

A FEW CLINICAL CASES (MOSTLY UNSATISFACTORY)

By T. I. ALEXANDER, M.R.C.V.S.

Kinsale.

Case 1.—Last December I was consulted about a horse which was rapidly losing condition. On inquiry from the owner I learned that he had lately bought the animal in off a rifle range where he had been grazing during the day, being housed at night.

History and examination did not reveal symptoms of any disease accompanied by wasting, and I was reduced to prescribing 1 oz. doses of sodii bicarb. in the drinking water and performing the operation known as "getting his teeth filed." I believed it was some form of subacute indigestion. I then forgot about him. On January 5 the owner asked me to go and see other horses on his farm, which he said were also losing condition, the first patient being no better. I found three horses and one mare stabled and one mare grazing on the range.

A peculiar symptom in connection with one of the horses, aged 15 years, was that he used to knuckle over on the fore fetlocks, and the owner said he nearly came down several times. The mare which was stabled, he said, also showed signs of weakness on her forelegs.

I, of course, suspected lead poisoning, especially as there had been an enormous amount of firing taking place on the range since last August. There was, however, no sign of the "blue line" present on the gums of any of the horses.

Examination and testing of the water supply, which was from a well, revealed nothing abnormal. In fact, it was a particularly good specimen of water. Examination of forage showed it to be sweet, clean, and sound. I, however, advised administration of two pints of ol. lini. to each horse and repeat in three days and an entire change of food, oats, hay, &c.; also housing of all the horses day and night, as it was evident that something on the range which they were picking up was the cause of the trouble.

An exhaustive inspection of the range (which nearly led to my arrest as a German spy) failed to reveal any botanical abnormality.

(I may be permitted to remark here that, though I know how many stamens are in a wallflower, the curriculum through which I passed when at college included no practical field training in the recognition of poisonous herbs, and when and where to look for them. And what is more important to a veterinary surgeon?)

On January 14 the owner again arrived to tell me that the mare which I found stabled on my first visit was down and could not get up, and that he believed that "the wather was playing agin her," *i.e.*, inability to micturate, a diagnosis beloved by farmers here in default of anything else.

On arrival I found the mare down and, with the exception of very slight twinges of colic, apparently normal as regards pulse and respirations. Endeavours to get her on her feet were hopeless, as she appeared to have lost all power in the fore limbs, and could not raise her fore part even with assistance. I gave her as placebo 2 oz. spts. æth., nit., propped her up, and left. She died next day. On the 18th the owner sent a message to say they had found the old horse dead in the stable in the morning, so I decided on a *post-mortem*.

The owner admitted that he had allowed him out on the range the evening before, disregarding my instructions, as per usual.

I found a distended stomach apparently packed with ingesta, in the thorax a ruptured diaphragm (*ante-mortem*), and a ruptured common aorta. The thorax, as a result, contained two enormous blood-clots, each the size of a liver. It was clear that he had gone to sleep standing and in his debilitated condition fallen, the engorged stomach by concussion rupturing the dia-

phragm and aorta, and death occurred rapidly from internal hæmorrhage. All the organs (liver, spleen, kidneys, and lungs) appeared healthy. Amongst the contents of the stomach, consisting of chewed hay and oats and a small quantity of poor grass, were very dark green masses of a chewed material with a most bitter smell: the best description of it was that it resembled the smell of a malt-house.

Though I have no recollection of any peculiar smell, the owner said a friend of his had remarked to him one day "that their dung smelled queerly." I believe this must have been the cause of the digestive trouble. I forwarded some of it to an authority on the subject, asking whether it would be heather or broom, of which there was a quantity on the range. The answer I got back was: "That material contained an amount of woody fibre, *probably* heather." Not very illuminating.

Now this man has had horses grazing on this range for twenty-five years and never lost one in a similar manner before. Though the rest of the horses have been doing well ever since and are kept off the range, I admit this experience left me in a bit of a fog. Is the ingestion of heather capable of producing such digestive disturbance, or am I perchance on the wrong track? I would be glad of information on the subject.

I may say the owner was not giving these horses any sort of meal or patent foods, nor had they at any time access to "grains."

Case 2.—I was called by wire to attend a sick bullock, who was very bad and dying. On arrival I was informed he had died "just ten minutes before I came in the gate." I was also informed that a bullock which was running with him had died the day before and showed exactly the same symptoms, viz., a discharge of a black tarry-looking material from the bowels, an inclination to run round in circles, finally exhaustion, convulsions, and death. I held a *post-mortem* in a small house where carcass had been dragged, and on opening the abdomen one's nostrils were at once assailed with a most penetrating pungent odour. As the house was small, the day a cold one, and the animal still warm, this odour could be appreciated to the full. Organs were normal. Abomasum contained about 1 lb. of river gravel, probably accumulated there and taken in whilst drinking at a river, but it was in the rumen where lay the chief seat of interest. It contained a normal

quantity of ingesta, but equally mixed with it was a large quantity of chewed leaves, and it was from this mass that the odour was emanating. Examination of material in conjunction with the smell, which after some time I recognized as being similar to Prussic acid, revealed them to be laurel leaves.

There are literally hundreds of laurels on this farm, and though the owner has had stock of all kinds running on it for twenty years he never remembered losing a beast in a similar fashion before. Why do animals pass a shrub to-day and eat it to-morrow? The age-long question which owners ask and veterinary surgeons cannot answer.

It was satisfactory in this case to be able to say to owner: "Behold, a case of laurel poisoning," instead of, as in the first case, humming and hawing, trying to look wise, and taking refuge in subterfuges.

(To be continued.)

AN ABDOMINAL CASE.

By RUSTICUS.

Subject.—A six-year-old, in-foal, half-bred, Shire mare.

At 6 a.m. on March 6, 1914, I was requested by owner to attend the animal, which had been griped during the greater part of the previous night. On my arrival I found the mare fairly quiet, pulse 60, temperature 101° F., slight tympany, respirations 20 per minute, rectum empty, but a certain amount of straining occurred during the passage of hand into the rectum.

I gave the diagnosis: "Impaction of the small intestines, probably at the ileocæcal valve, possibly a twist, but as there was an absence of violence and sweating I did not absolutely think a twist had occurred." The stimulant treatment advocated by Mr. H. Caulton Reeks was adopted. The mare remained in about the same condition all day. There were only two symptoms exhibited at 7.30 p.m. which seemed to indicate to me that volvulus might be present.

Firstly, the mare crouched several times before lying down. Secondly, when down she would poise on her back with her knees and hocks flexed for an hour or more without moving.

At 11 a.m. the next day the tympany had subsided, pulse 75, temperature 102.6° F. No dung had been passed. The mare did not sweat, but could only get relief when lying on her back, which position the owner said she had assumed during the greater part of the night.

My opinion now was one of volvulus. The mare was destroyed, and *post-mortem* revealed hernia of a loop of the ileum through Meckel's diverticulum and aneurism of the posterior aorta.

The owner, who bred the mare, said that she had never been ill before.

In this case I should think the aneurism was the primary cause of the colic, and that hernia and strangulation of the bowel took place during the first night of the animal's illness. Was this a case for laparotomy?

SOME NOTES INCIDENTAL TO PARTURITION.

By RUSTICUS.

Subject.—A five-year-old Shire mare.

I was called at 7 p.m. on April 12, 1913, to attend the above subject, which had foaled alone during the previous night.

The mare was recumbent. She got up with difficulty, but stood firmly on her legs; when made to walk she reeled as if she had injured her spine; there appeared to me a left lateral movement of the hind quarters, but without any dragging of the toe or knuckling of the fetlock joint.

Pulse, temperature, and respirations were normal; appetite for bran mash and scalded hay good. Passage of fæces normal, but owner said he had not noticed her urinate. Passed the catheter and removed about two quarts of urine.

Examination *per rectum* revealed tenderness of the region of the left innominate bone. I formed the diagnosis, rupture of the left sacro-sciatic ligament.

Treatment.—Stimulating liniment to the left haunch. Nuxvomica internally for two weeks.

The mare remained in the same condition all the summer, but finally recovered, and was put to work again in November. She is still employed on the farm, but the muscles of the left haunch are slightly atrophied.

(To be continued.)

THREE CASES TREATED BY AUTOGENOUS VACCINES.

By J. F. D. TUTT, M.R.C.V.S.

Winchester.

CASE 1.

Subject.—Bay mare. *Aged.* *Disease.*—Chronic uterine discharge. *Micro-organisms present.*—(1) A streptococcus; (2) a club-shaped bacillus.

From these Professor Annett, of the Runcorn laboratories, prepared an autogenous vaccine, each cubic centimetre of which contained 6,000,000,000 organisms, made up of 3,000,000,000 of each of the above-named organisms.

The first injection of 6,000,000,000 organisms was made on February 2, and the injections were repeated at intervals of five to seven days. Latterly the dose was increased to 12,000,000,000 organisms.

Remarks.—At first very little improvement was noted, but later on a gradual diminution with final cessation of the discharge resulted. Previous to using vaccine, douches of all the usual agents were tried, but with no success.

Result.—Cured.

CASE 2.

Subject.—Grey mare. *Disease.*—Suppurating fetlock. *Micro-organisms present.*—(1) *Bacillus coli*; (2) *Staphylococcus albus*; (3) *Streptococcus brevis*; (4) an elongated diplococcus.

From these an autogenous vaccine was prepared by Professor Annett, each cubic centimetre of which contained 8,000,000,000 organisms in all, made up of 2,000,000,000 of each of the above-named organisms.

The first dose of 8,000,000,000 organisms was given on February 13, and repeated at intervals of five to seven days. In conjunction with vaccine treatment, Bier's method of inducing hyperæmia was adopted.

Remarks and Result.—The discharge gradually became less

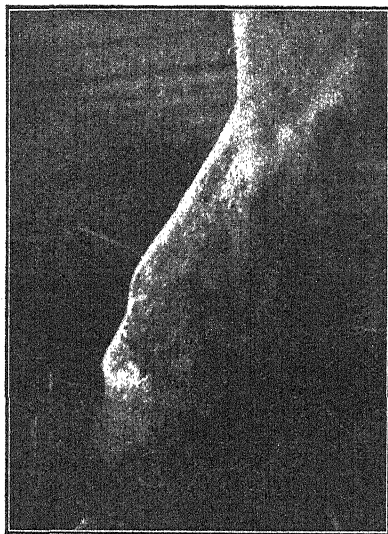
towards the end of the vaccine treatment and has now ceased, although some swelling still remains.

CASE 3.

Subject.—Shire stallion. *Disease.*—Suppurating fetlock. *Micro-organisms present.*—(1) *Streptococcus brevis*; (2) *Bacillus coli*; (3) *Staphylococcus albus*.

From these Professor Annett prepared an autogenous vaccine, each cubic centimetre of which contained 15,000,000,000 organisms in all, made up of 5,000,000,000 of each of the organisms stated.

March 20.—15,000,000,000 organisms injected.



March 25.—30,000,000,000 organisms injected. Discharge stopped.

April 1.—45,000,000,000 organisms injected. Wounds practically healed.

April 3.—Discharged cured.

Remarks.—In conjunction with and before vaccine treatment, Bier's hyperæmia treatment was adopted, but no alteration in the case was observed until I adopted vaccine treatment as well. I had the wounds, which were three in number, cleansed three times a day with dilute solution of coal tar and then anointed with Vitiod ointment.

PAPILLOMATOUS CYSTITIS IN A COW.

By H. A. REID, F.R.C.V.S., D.V.H., F.R.S.E.

Officer in Charge, Veterinary Laboratory, Wallaceville, New Zealand.

THE accompanying photographs represent a rather interesting case of villous papilloma of the bladder observed at one of the meat export slaughter-houses.

The subject, a cow, had been sent in for slaughter. She was in very fair condition, the only noticeable abnormality being a tendency to pass, at irregular intervals, small amounts of slightly blood-stained urine.

On *post-mortem* examination by the Government Inspector the bladder was found to be profoundly altered, and the kidneys also were diseased.

These organs were secured and forwarded to the laboratory for further examination.

The bladder was enlarged and its walls much thickened (1.4 cm.), with corresponding narrowing of the lumen.

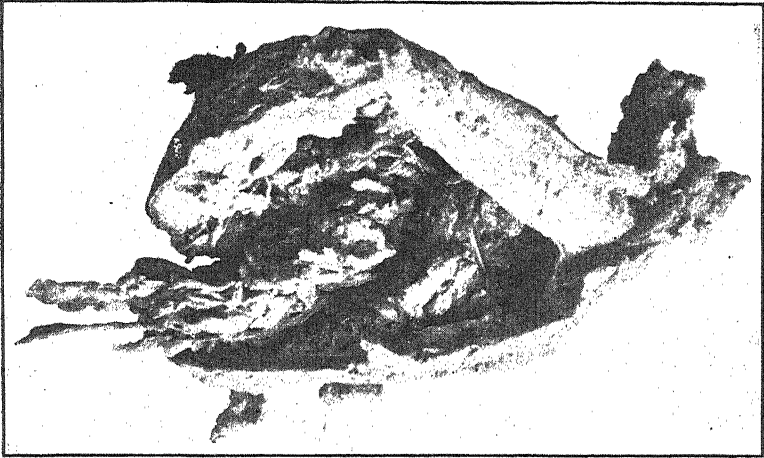
The interior was filled with a yellowish-red mass of fleshy, gelatinous material and numerous hæmorrhagic clots.

Externally, in at least two places, there appeared extrusions of the internal mass through ulcerations in the wall of the bladder.

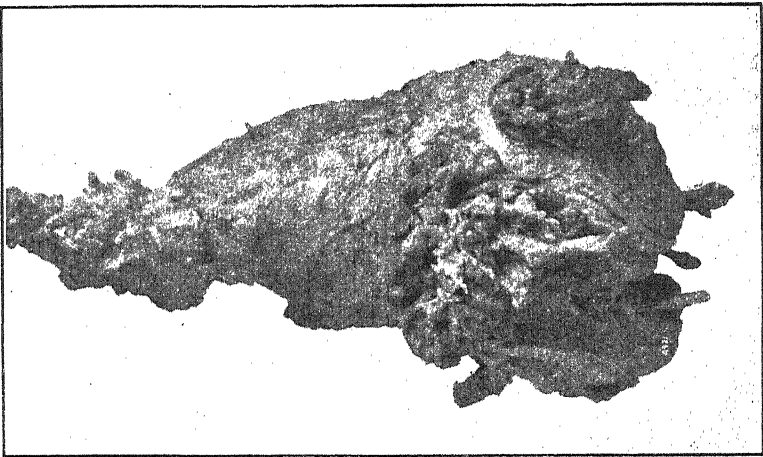
What remained of the mucous lining showed evidence of a phlegmanous cystitis.

One of the kidneys was slightly atrophied. Both showed beneath the capsule a number of raised whitish spots. On section pus was found in the pelvis, this condition being due to an ascending suppurative nephritis.

The case is remarkable as illustrating the extent to which the animal was affected without showing any very marked loss of condition, as indicated by the fact of her being considered fit for slaughter for human consumption.



Bladder cut open to show internal aspect.



Showing the extruding portions of villous mass.

Abstract.

BOARD OF AGRICULTURE AND FISHERIES.

ANNUAL REPORT OF PROCEEDINGS UNDER THE DISEASES OF ANIMALS ACTS, THE MARKETS AND FAIRS (WEIGHING OF CATTLE) ACTS, &C., FOR THE YEAR 1914.

IMMEDIATELY upon the outbreak of the European War in August, steps were taken so to modify the procedure under the Diseases of Animals Acts as to relieve the local authorities and their police of such duties as could be suspended temporarily without seriously affecting the operations against contagious diseases in animals. At the same time the procedure of the Board in connection with outbreaks of swine fever was also modified, with the object of conserving the supply of swine, including breeding swine.

In the former connection the operation of the Tuberculosis Order of 1914 was entirely suspended, as was that of the Parasitic Mange Order of 1911, except as regards the prohibition of the exposure in markets or the movement of affected animals. The operation of the general Orders requiring the annual dipping of all sheep was also suspended, but certain special sheep-dipping Orders, applying to particular districts, were allowed to remain in force.

A modification was also made as regards the restrictions under the Swine Fever (Regulation of Movement) Order of 1908 affecting the movement of swine for slaughter so as to allow of such movement on a declaration of the owner as to the health of the swine to be moved, without the issue of a licence by the police authorities authorizing each particular movement. As regards swine fever outbreaks, the instructions to the Board's inspectors were varied so as to require the slaughter by them of all swine remaining alive on infected premises only in cases in which effective isolation was found to be impracticable. The arrangements hitherto obtaining for the slaughter, with compensation, of breeding animals found alive on swine fever infected premises were cancelled, and the special experimental procedure in force in Scotland and in Wales, under which all swine on infected premises, and also swine found on other premises which had been recently in contact with the swine on the infected premises, were valued and slaughtered by the Board's officers, was suspended.

The exceptional conditions obtaining in the year 1914 will have, therefore, to be taken into account in any comparative review of the operations against contagious diseases in animals which may be made in future years.

The appearance early in the year of foot-and-mouth disease in Ireland afforded a severe test of, and at the same time a practical justification for, the arrangements made in January, 1913, for controlling permanently the landing in Great Britain

of animals from Ireland. As will be seen from subsequent paragraphs of the report, the disease obtained a foothold in the landing-place for Irish animals at Birkenhead, and appeared subsequently during the months of February and March in the City of Liverpool, and also in the counties of Durham, Worcestershire, and Carnarvonshire. The disease was not eradicated from Ireland until the middle of the month of July. In the month of August disease made its reappearance in Great Britain in the neighbourhood of Grimsby, Lincolnshire; in October, both at Deal, in Kent, and near Wellingborough, in Northamptonshire; and in December, near Bedford. This latter series of apparently isolated outbreaks was not, so far as can be ascertained, in any way connected with the outbreaks in Ireland. In all, twenty-seven outbreaks of foot-and-mouth disease were confirmed in Great Britain in 1914, as against two in the previous year.

The position as regards swine fever has been in the highest degree unsatisfactory throughout the year, and in several districts the outbreaks have been of a most virulent type. The total of 4,356 outbreaks exceeds by 1,783 the number confirmed in 1913. In the course of the autumn extended arrangements for the application of treatment by anti-swine-fever serum were brought into operation, but sufficient time has not yet elapsed for any judgment to be formed as to the effect of the treatment in reducing the prevalence of the disease, the stamping out of which may now almost be regarded as beyond the reach of the procedure at present in operation.

For the reasons given in the section of the report dealing with tuberculosis in bovine animals, material is lacking for any comparative statement regarding that disease, and owing to the suspension of the operation of the Parasitic Mange Order, the figures for parasitic mange in 1913 and 1914 are only comparable in respect of the first thirty-two weeks of each year. During that period 1,511 outbreaks of the latter disease were reported by local authorities in 1914, as against 1,846 outbreaks in 1913. A few additional outbreaks were dealt with by local authorities after the suspension of the Order, bringing the total number reported up to 1,530. The number of outbreaks of anthrax confirmed during the year 1914 was 722, an increase of 128 outbreaks as compared with the previous year. The number of outbreaks of glanders shows, on the other hand, a substantial decline, viz., 97 outbreaks in 1914, as compared with 162 in 1913. Of sheep-scab, 226 outbreaks were reported to the Board in 1914, as against 235 in 1913.

FOOT-AND-MOUTH DISEASE.

From January 31, 1914, onwards the attention of the division was engaged, almost without cessation, on matters connected with foot-and-mouth disease, so much so, that although the actual number of outbreaks in Great Britain has in previous years been higher, it has probably never before been the case that the disease has been more troublesome to deal with from an administrative point of view. In this connection, the fact

that twenty-nine suspected cases of the disease had to be dealt with in addition to the twenty-seven confirmed outbreaks must not be lost sight of.

In these circumstances, the fact that it has been possible to maintain in this country a position which compares very favourably with that of most Continental countries, in spite of the risks incurred from the disorganization caused by the War, and the constant arrivals in England of refugees from the Continent, and of soldiers and others who have been engaged in the military operations, is a matter for satisfaction, since, although during the autumn unconnected outbreaks of this disease occurred at four distinct centres in England, the measures adopted have sufficed to prevent any general spread of infection.

The havoc which follows an initial failure to secure control of this disease is well illustrated by the experience of the United States of America. Since the suppression of the serious outbreak in 1908-1909, the United States had enjoyed a period of complete immunity from this disease. In October last the disease again made its appearance near Niles, in the State of Michigan, and by the beginning of December it had spread both eastwards and westwards to such an extent that outbreaks had been discovered in no fewer than 210 counties in eighteen separate States. From the State of Washington, on the western coast, to New Hampshire and Maryland on the eastern coast, hardly a State escaped infection, and, notwithstanding the fact that by the end of the year the disease was stated to be well in hand, the later information does not go to show that the area affected has been substantially decreased or that the end of the outbreak is in sight.

Owing to the fact that all the foreign animals' wharves in this country were at the time closed, this serious outbreak did not call for administrative action, so far as the Board were concerned, in connection with the importation of live animals, but it appears desirable that some reference should be made to it in this report, as, in other circumstances, steps designed to protect this country from the risk of the introduction of infection would have been necessary.

TUBERCULOSIS.

The year 1914 was a period of transition so far as operations against bovine tuberculosis are concerned, inasmuch as a revised Order came into force on July 1, 1914, which not only introduced a new basis for the valuation of animals to be slaughtered under the Order, but added to the forms of tuberculosis to be dealt with thereunder by requiring the slaughter of any animal found by the local authority to be suffering from a chronic cough and showing definite clinical signs of tuberculosis.

It will be convenient, therefore, to review separately the proceedings under the revoked Order during the full period in which it remained in force, and those under the new Order during the period of its operation commencing July 1.

The Order of 1913.

This Order remained in force from May 1, 1913, to June 30, 1914, a period of fourteen months.

It is to be observed that so far as England is concerned the average number of animals dealt with monthly during 1914 dwindled very considerably. As regards Wales, the monthly average during the two periods varied but slightly, whilst in Scotland there has been an apparent increase. The latter figures must, however, be discounted owing to the fact that there was a very considerable delay on the part of a number of Scottish local authorities in putting the Order into force in their respective districts, so that it was not until the month of November, 1913, that its operation became general in that country, after which the average number of animals dealt with remained fairly constant.

In Great Britain, as a whole, during the full period of operation of the Order, 7,952 notices of intended slaughter were received from local authorities in respect of 7,378 premises, divided between the three countries as follows: England, 6,181 notices in respect of 5,702 premises; Wales, 348 notices in respect of animals on 333 premises; and Scotland, 1,423 notices relating to animals on 1,343 premises.

As regards the distribution of the disease, the position did not alter appreciably in the first six months of the year 1914, and there was no change in the order of the first six counties, which were Lancashire (713 premises, 747 animals), West Riding of Yorkshire (616 premises, 645 animals), Chester (476 premises, 517 animals), Wiltshire (357 premises, 433 animals), Derbyshire (291 premises, 304 animals), and Staffordshire (290 premises, 306 animals). In three other counties, the number of premises involved exceeded 150, namely, Devon (188), Cornwall (179), and Somerset (151). Nine counties made returns relating to more than 100 and less than 150 premises, while in ten counties the numbers were over 50 and less than 100. Twelve counties returned from 25 to 50 premises as affected, and in the remaining nine, less than 25 premises were involved in each case.

Of the boroughs in the English counties, two returned 42 premises as affected (Liverpool and Sheffield), Bradford (34), Leeds (31), Bacup (27), Rawtenstall (23), and Halifax (21) being the next. In ten other boroughs the number of premises concerned exceeded 10.

As regards Wales, Anglesey returned 103 premises; Flint, 78; and Denbigh, 71. Carnarvonshire made returns relating to 26 premises, but of the other eight counties in Wales, one (Radnor) did not return any premises as affected, and the other seven returned less than 25—the numbers ranging from 15 in Merioneth to 1 in Pembroke, in the last-mentioned case the premises being situate in the borough of Pembroke.

In Scotland, the number of premises involved exceeded 150 in two cases (Aberdeen 158 and Ayr 154), the next counties in order being Lanark (145), Kirkcudbright (120), and Forfar (108). Four other counties returned more than 50 premises, and four

more than 25 and less than 50. In eighteen counties the number varied from 1 to 24, and in two cases (Shetland and Peebles) no notices were received by the Board.

Perth (22), Edinburgh (14), and Greenock (13) were the only burghs or cities which returned more than 10 premises.

The Order of 1914.

The Order of 1913 was issued largely on an experimental basis, and experience gained in its administration revealed certain points on which amendment of its provisions appeared desirable. One of the requirements which had become the subject of criticism was that under which animals had to be valued on a double basis; namely (*a*) that the cause of their apparent illness or defect was tuberculosis, and (*b*) that such illness or defect was not caused by tuberculosis. The reason for the provision in the old Order was given in the Report for last year, but after full consideration of the representations received from various quarters it was decided that the new Order should provide for a single valuation based on the market value of the animal at the time of valuation.

This change served also to meet the complaint that the compensation payable to owners of animals slaughtered by a local authority under the old Order was inadequate, since, although in the new Order the scale of compensation, viz., the full value of the animal and a further sum of 20s. where the *post-mortem* examination does not show tuberculosis; three-fourths of the valuation where such examination shows the disease to be present otherwise than in an advanced form; and one-fourth of the valuation where the animal is certified to be suffering from advanced tuberculosis, has not been altered, the amount now payable is assessed on the market value of the animal, instead of upon its tuberculous or non-tuberculous value, as the case may be.

The third chief cause of complaint against the old Order was connected with the expenses of administration. At the time when the issue of that Order was decided upon it was anticipated that the cost of compensation would amount to a very high figure, and that an Exchequer contribution by way of refund to local authorities of *one-half of the net cost* (i.e., the amount of compensation less the proceeds of the sale of the carcasses or parts of the carcasses of slaughtered animals), arising under that head would provide an equitable basis for the distribution of the burden between local and Imperial funds. The causes which led to this anticipation being falsified are discussed in the report above referred to, but, whatever circumstances may have contributed to the result, the fact remained that the expenses of administration, apart from compensation, were found in practice to bear a very much higher proportion to the total cost than had been expected.

Before issuing the new Order, therefore, the Board approached the Lords Commissioners of the Treasury on the subject of an alteration of the basis upon which the Exchequer contribution

should be calculated, designed to relieve local funds of some larger proportion of the total cost of administering the Order. After the point at issue had been considered in all its aspects, their lordships decided that such contribution should continue to take the form of a refund of a proportion of the actual payments made by local authorities by way of compensation for animals slaughtered, but that the amount to be refunded under any new Order for the remainder of the period of five years for which an Exchequer contribution had been promised should be *three-fourths of the gross compensation (i.e., without any deduction in respect of the proceeds of the sale of carcasses), computed on the market value of the animal as ascertained by the valuer.*

The effect of this decision is not only that a larger proportion of the compensation payable under the new Order falls ultimately to be defrayed directly from Imperial funds, but that the balance of such compensation, except as regards cases in which the amount of salvage obtained falls short of one-fourth of the sum payable as compensation, will not be a charge on local funds, inasmuch as the local authorities are authorized to retain all sums received by them as salvage in respect of the carcasses, hides, &c., of slaughtered animals, except where surplus proceeds of salvage are payable by them to the owner of the animals on account of the fact that the amount thus received exceeded the amount paid as compensation for the live animal.

In addition to the above-mentioned changes, the scope of the Order was extended by requiring that a report should be made by the owner or person in charge in respect of any bovine animals suffering from chronic cough and showing definite clinical signs of tuberculosis. All such animals now become the subject of the veterinary inquiry prescribed in the Order, and where the report of the veterinary inspector shows that the suspected animal is so affected, its slaughter, with compensation, by the local authority is provided for. This new provision will enable the local authority to deal with animals of a distinctly dangerous class, from the point of view of the spread of the disease amongst animals, at an earlier period than would have been possible under the former Order.

The complete figures for the year are accordingly that as regards Great Britain notifications were received in respect of 3,976 premises, 4,240 animals being returned as diseased. In view of the facts above set out these figures have little or no value for purposes of future comparisons.

Returns for July, 1914.

Some light, however, is thrown upon the probable effects of the Order of 1914 as regards the number of animals falling to be dealt with under the extended provisions of the new Order by the returns for the month of July, which show that the total number of notifications received was 766, the number of animals returned as diseased, including animals suffering from chronic cough and showing definite clinical signs of tuberculosis being 816.

SWINE FEVER.

In no year since 1896 has the figure as to the total number of outbreaks of swine fever in Great Britain been so high as in 1914. During last year 4,356 outbreaks were confirmed, as compared with 2,573 outbreaks in 1913 and 2,920 in 1912. In 1896 the outbreaks numbered 5,166. As compared with 1913, the outbreaks in Great Britain in 1914 show an increase of 1,783. In England the increase in the number of outbreaks was 1,805, in Scotland 6. Wales, on the other hand, shows a small decrease of 28 outbreaks. The total number of swine slaughtered as diseased or exposed to infection was 39,277, as against 32,034 in 1913, but the suspension of the slaughter arrangements owing to the War renders these figures non-comparable.

The number of reports of the suspected existence of the disease received during the year, viz., 19,125, largely exceeded the high figures of 14,044, and 16,204 recorded in 1913 and 1912 respectively, and there was a percentage of outbreaks to reports of 22·8.

It was noted in the Report for 1913 [Cd. 7321] that during the latter half of that year the position, which had given evidence of some slight improvement in the earlier part of the year, was becoming less satisfactory, and subsequent events showed that the unfavourable turn in respect of this disease did, in fact, continue. During the first half of the year 1914 the outbreaks exceeded those in the corresponding period of 1913 by 958, and in the second half by 825, and the actual number of outbreaks in the second half of 1914 was only 20 fewer than in the first half of the year, the figures for the concluding quarter being exceptionally unfavourable. The outlook for 1915 must, therefore, be regarded as a gloomy one. It is accordingly with a full sense of the seriousness of the existing situation that the following points are put on record as showing that the set-back in the operations against the disease is not so general as might at first sight be inferred from the figures relating to the country as a whole.

In the five eastern counties, Norfolk, Suffolk, Cambridge, the Isle of Ely, and Essex there occurred in 1914 no fewer than 1,247 outbreaks of swine fever, an increase of 918 outbreaks over the figure for 1913. In the three ridings of Yorkshire and the three divisions of Lincolnshire 696 outbreaks were confirmed, an increase of 213. Again, in the southern and south-western counties of England, including Gloucestershire, 1,268 outbreaks were returned; that is to say, 453 in excess of the figure for the previous year.

It will thus be seen that of the excess of 1,783 outbreaks in Great Britain as a whole 1,584 are accounted for in the above-mentioned counties, which are situated on the eastern and southern coasts of England, or adjacent thereto, or, in other words, as regards the whole of the remainder of England, and in Wales and Scotland, the number of outbreaks of the disease in 1914 exceeded those in 1913 by 199 only.

In some parts of Suffolk and Essex and in West Sussex the disease was met with in an extremely virulent form. This fact,

taken into consideration with the exceptional conditions existing in the eastern and southern counties owing to military operations, makes it not, perhaps, very surprising that the disease should have made such headway. The pressure on the Inspectorate occasioned by the unexpected call made upon them during the year has also made it increasingly difficult to follow up rapidly and thoroughly the history of each outbreak, and thus to keep to some extent ahead of the disease. In these circumstances, the fact that the epidemic has not been even more widespread is a matter for some satisfaction, and it is to the existence of general precautionary restrictions on the movement of swine that this result may safely be attributed.

Turning to the position in individual counties, it is to be noted that the very large total of 485 outbreaks was reached in Suffolk, as against 71 in the previous year. Essex, with 471 outbreaks, as against 124, was very little behind that figure.

In the West Riding of Yorkshire 328 outbreaks were recorded, against 217 in 1913; in Gloucestershire, 238 against 116; and in Norfolk, 213 against 87. The return for Wiltshire is 185 outbreaks against 177 in the previous year; for Somerset, 158 against 147; for Kent, 155 against 114; for Surrey, 108 against 56; and for the North Riding of Yorkshire, 101 against 67.

There were only seven counties in England, namely, Cheshire, Shropshire, Hertfordshire, Buckinghamshire, East Sussex, the Isle of Wight, and Monmouth in which any improvement upon the figures of 1913 is shown, and the most notable decrease was that of 34 outbreaks in Bucks. In Wales, improvement is shown in the counties of Denbigh, Glamorgan, Flint, and Montgomery; whilst in Scotland the same may be said of Banff, Dumfries, Linlithgow, Midlothian, and Perth.

In what must be on the whole a very unfavourable review of the situation, the fact is not to be lost sight of that, according to the statistics collected in June of each year, there has been notwithstanding a decided increase in the number of pigs now kept in the country, the total increase for Great Britain of 400,394 swine, being divided as follows: England, 348,431; Wales, 30,948; and Scotland, 21,015, a total increase in England and Wales of 18 per cent., and in Scotland of 15·9 per cent. In sows kept for breeding purposes the increase in England and Wales was 59,529, or 21·2 per cent., and in Scotland 4,696, or 31·8 per cent.

The modifications in the general procedure adopted with regard to swine fever during the latter portion of the year are explained in the opening section of this Report in connection with the arrangements made on the outbreak of war. The reasons for this action still continue.

Artificial immunization against Swine Fever.

On January 26, 1914, the Swine Fever Committee issued their Second Interim Report [Cd. 7247], which deals solely with the question of the artificial methods of immunization of swine against swine fever in the light of the information gained

through the inquiries made by officers of the Board on the Continent, to which reference was made in the Report for 1913, and puts on record the opinions that:—

(a) Inoculation with serum alone affords too brief immunity to be of practical value.

(b) Every known method of vaccination, or simultaneous inoculation with serum and virus, exposes the inoculated animal to risk and renders it infective to others.

(c) Existing methods of inoculation do not promise assistance in the eradication of swine fever, though they might be serviceably employed in connection with a policy of control.

(d) Further experiment is necessary with a view to finding a form of vaccination which will give active immunity to the inoculated animal, without risk of further loss and dissemination of the disease.

The Committee further considered that the experiments which were being initiated by the Board on the recommendation of the Committee should be continued.

That course has been followed, and it will shortly be possible to furnish the Committee not only with a full report of the experiments in question, but also with the results of certain operations undertaken by the Board in the later months of the year in a district round Colchester, where treatment of the swine involved in outbreaks with anti-swine-fever serum was undertaken by the Board in all cases in which the premises were suitable for the purpose whenever the owner agreed to the adoption of the treatment. The district in question was one of those in which the more virulent form of the disease had been present, occasioning severe losses to the owners concerned, and the procedure was adopted as affording them a means of lessening such losses.

With this information before them it is to be expected that the Committee will be in a position before very long to make their final report to the Board on the cause of the continued prevalence of swine fever in Great Britain and the practicability of the adoption of any measures with a view to securing its speedy extirpation, and with the recommendations of the Committee before them the Board will be enabled to come to some definite decision as to their future procedure in that connection. In the meantime, the only practicable course seems to be to continue to deal with outbreaks as they arise in accordance with the procedure established on the outbreak of the War.

SHEEP-SCAB AND THE COMPULSORY DIPPING OF SHEEP.

The steady diminution in the prevalence of sheep-scab in Great Britain, which was recorded in the Report for last year, gave rise to representations from various agricultural societies—including the Council of the National Sheep Breeders' Association and the Royal Agricultural Society of England—to the effect that more stringent means should be taken towards the total eradication of this disease, and that such measures should include regulations of a stricter character dealing with districts and individual farms

where the disease is known to exist, and also precautions against the introduction of the disease by means of sheep brought to this country from Ireland.

This aspect of the question had by no means been lost sight of, and an indication had already been given that some special steps were likely to be taken in respect of Irish sheep. Orders relating to the double dipping of sheep on individual farm premises had, from time to time, been issued by the Board, and such dipping had also been prescribed in specified areas in which the disease was prevalent.

After full consideration it was decided that it would be advantageous to put the latter requirements into a general Order—the Sheep (Double Dipping) Order of 1914—which could be made to apply to any defined area by a separate Order of the Board, and, further, that an Order—the Sheep-Scab Order of 1914—should be made authorizing the application of its special provisions to individual premises by a notice served upon the occupier, either by an inspector or other officer of the Board, or by an inspector of the local authority of the district, intended to meet the case of any premises as regards which the Board or the local authority have reason to suspect that sheep-scab exists undetected, or that a risk of infection has been incurred.

Outbreaks in 1914.

The returns as regards sheep-scab in Great Britain during the year 1914 are less unfavourable than might at first sight be inferred from the fact that the total of 226 outbreaks is but nine fewer than the total for 1913.

It will be noted that in respect of this disease the year 1914 started badly, the return for the March quarter showing an excess of 29 outbreaks over the figure for the corresponding quarter of 1913. In each succeeding quarter the figures for 1914 were favourable, the decrease for the three quarters being 38 outbreaks, leaving a balance of 9 outbreaks in favour of 1914. The return for the December quarter is particularly favourable, showing a decrease in Great Britain of 30 outbreaks, the improvement in Wales being specially marked, 5 outbreaks only being recorded in four counties, as against 36 outbreaks in nine counties in 1913. That counties like Cardigan, Glamorgan, Merioneth, and Montgomery should have a clean record for the first winter quarter is noteworthy.

Suspension of Compulsory Dipping Orders.

As has been indicated in the opening section of this Report, the suspension of the operation of the General Orders requiring the compulsory dipping of sheep was one of the measures taken on the outbreak of war with a view of lightening the duties of officers of local authorities in connection with the Diseases of Animals Acts. Some apprehension has been expressed that this action was calculated to prejudice the favourable result of the

Board's operations against sheep-scab. There is nothing, however, in the above figures to show that the action taken has had any such detrimental effect, and there is reason to believe that, as a matter of fact, the dipping of sheep in the autumn was very generally carried out by flockmasters notwithstanding the suspension of the Compulsory Order. It is recognized, however, that any prolonged suspension of the general dipping requirements is undesirable, and it is intended that they shall be reimposed in a somewhat modified form at an early date.

ANTHRAX.

For the first time since the new Anthrax Order of 1910 has been in operation the returns as to the confirmed outbreaks of anthrax show an increase, the number of outbreaks recorded in 1914 being 722 as against 594 in 1913. As has been explained in previous reports, the Order of 1910 brought into operation, as from January 1, 1911, a procedure whereby no suspected case of anthrax is included in the returns until the veterinary officers of the Board have confirmed the existence of the disease. It is of interest, however, to note that this increase of 128 outbreaks in the comparative figures was practically confined to the first half of the year, the return for the second half of 1914 being only four in excess of that for the second half of 1913.

The figures for 1914 still, however, compare favourably with those for 1912 when 743 outbreaks were confirmed, and in view of the fact pointed out in the preceding paragraph there seems no reason to suppose that the disease is gaining any permanent headway.

During 1914 anthrax existed in seventy-four counties in Great Britain, as against sixty-seven counties in 1913. In England, the 415 outbreaks recorded occurred in forty-six counties; in Wales, 5 outbreaks in three counties; and in Scotland, 302 outbreaks in twenty-five counties.

In Wiltshire the outbreaks in 1914 exceeded in number those returned in the previous year by 19; in Lancashire by 18; and in Cornwall by 14; and, as regards Scottish counties, in Aberdeenshire the excess was 33 outbreaks, and in Lanarkshire 12 outbreaks. In other counties the variations in the figures for the two years were slight, except in the case of Fife, where the total was 12 fewer in 1914.

The fact that in the case of anthrax infection may be imported in various manners, and especially in feeding stuffs for animals, makes it difficult to assign to any one particular cause the increase from time to time in the number of outbreaks recorded. Moreover, in certain parts of the country possible sources of infection exist in connection with trades using imported hides of animals as their raw material. Should it occur in any particular year that an excessive amount of infective material is imported, some increase in the disease in this country may be expected to follow. The information available does not enable any definite conclusions to be come to on these points, but steps have now been taken

to obtain from local authorities fuller information as regards each outbreak, and with such particulars as have now been called for it may be possible in future to draw more precise inferences on these points.

GLANDERS.

During 1914 there has been a steady decline in the prevalence of glanders, the outbreaks being fewer as compared with the corresponding quarters of 1913 by 20 in the March quarter, 15 in the June quarter, 5 in the September quarter, and 25 in the December quarter, showing a total reduction of 65 outbreaks (97 against 162) as between 1913 and the year under review.

In Wales no outbreak was recorded, as against 1 outbreak in 1913.

In Scotland 4 outbreaks occurred in three counties, the figures and the number of counties being identical in each year.

In England 93 outbreaks occurred in sixteen counties involving 276 horses, as against 157 outbreaks in fourteen counties involving 430 horses. The outbreaks were, therefore, 64 fewer, and 154 fewer horses were attacked, although the number of counties making returns was greater by two.

The want of progress in the operations against this disease which had to be recorded last year no longer obtains, and the outbreaks of glanders in Great Britain have been reduced to less than 100 for the first time since 1874, the year in which the records commence. As lately as the year 1906 the outbreaks exceeded 1,000, whilst in 1909 they still exceeded 500. In the two following years the totals reached 351 and 209 outbreaks respectively, whilst in 1912 they fell to 172.

This record cannot be considered as otherwise than satisfactory from the point of view of the complete eradication of the disease, and in this connection the improvement in the position in and around the metropolis is a matter for special satisfaction.

As regards the indications referred to in the Report for 1913 that glanders was being imported into this country by Russian ponies, representations on the subject were made in due course to the Russian Government, but both the preliminary negotiations and the trade in these ponies were brought to a standstill by the outbreak of war, and there is no immediate prospect of their being renewed.

PARASITIC MANGE.

The returns for the year 1914 show that 1,530 outbreaks of parasitic mange were reported from sixty-nine counties in Great Britain, 2,642 horses being attacked by the disease. The suspension of the Parasitic Mange Order as from August 6 makes these figures valueless for the purpose of comparison with the returns for previous years.

It may be useful, however, to put on record such a comparison in respect of the first half of 1914 and that of the corresponding half of the previous year—the more so that it is in the first half of the year that the disease is most prevalent.

In respect of that period there was in 1914 a satisfactory decrease of 279 outbreaks in Great Britain, the horses returned as attacked by the disease being 926 fewer than in 1913. In England the decrease in the number of outbreaks was 263, and of horses attacked 836; in Wales the outbreaks were 41 fewer, and the horses attacked 136. In Scotland, on the other hand, there was an increase of 25 outbreaks, and 46 more horses were attacked by the disease than in the previous year.

As in 1913, the disease continued most prevalent in London, 258 outbreaks; Lancashire, 243 outbreaks; and in the West Riding of Yorkshire, 118 outbreaks. In each of these districts, however, the figures show some improvement on those for the first half of 1913. Kent and Warwickshire, in England, and Glamorgan, in Wales, are also counties in which the number of outbreaks has shown an appreciable decrease. At the same time, there is hardly a county in which any substantial increase in the prevalence of the disease is shown.

In these circumstances it is a matter for regret that any interruption in the beneficial work which is being done under the Order should have become necessary, and it is the intention of the Board to bring the Order again into operation so soon as they are satisfied that such action on their part will not throw any undue strain on the officers of local authorities, especially in those parts of the country in which the military operations have largely increased the duties of the police.

REGULATIONS AS TO DOGS.

During the past year the restrictions in respect of dogs imported into Great Britain from abroad were modified so as to require detention and isolation on veterinary premises for a period of four calendar months from the date of landing of the dog in this country. The period of quarantine required by the Order of 1901 was six months, but it had been the practice to release from detention by special order before the expiration of the full quarantine period—but with a minimum of three months' detention—dogs in respect of which certain declarations could be furnished by the owner as to the conditions under which they had been kept whilst abroad, and other modifications in the application of the restrictions had been made from time to time to meet special cases.

In issuing the Importation of Dogs Order of 1914 the Board at the same time decided that the various concessions referred to above which had hitherto been made should no longer be allowed, and that the four months' detention and isolation should, as a general rule, be enforced in respect of all dogs landed in this country on and after November 1, 1914.

The number of dogs which had been imported into Great Britain during the year 1914 exceeded by over 50 per cent. the number so imported during 1913, which number was itself the highest which had been recorded for any year up to that time. In 1914 the number of dogs landed reached the unprecedented

total of 1,250, of which 595 were landed during the first seven months of the year and the remainder in the last five months. The latter period may be said to cover roughly that from the declaration of war to the end of the year. It will thus be observed that the increase was not confined to the latter part of the year, and the pressure on this work was fairly consistent throughout the whole of the year. Of these 1,250 dogs, 909, or 72·75 per cent., were detained on veterinary premises which have been generally approved for the reception of all classes of dogs. The number of imported dogs released from quarantine during the year was 697, and the largest number under detention at any one time was 462, as compared with 308 in the previous year. Sixty-five dogs were landed for export abroad.

Among the causes which contributed to the extraordinary increase in the number of dogs imported may be cited the large influx of refugees from the Continent, the arrival of the Canadian Expeditionary Force in this country with many dogs as regimental pets, and the return of soldiers to this country from abroad in connection with the War.

The number of troupes of performing dogs which were landed during the year naturally shows a large decline, the number falling from 62 troupes in 1913 to 26 in the year under notice.

A similar fall occurred in the number of other canine animals landed under the terms of the relative Order of the Board. In 1913 30 such animals were imported, but in 1914 the number was 12 only, namely, 10 foxes and 2 wild dogs. All these animals were consigned to zoological gardens for detention.

EXPORTATION AND SHIPMENT OF HORSES.

The Exportation of Horses Act, 1914, amends the Diseases of Animals Act, 1910, in respect of the exportation of horses by enacting that the prohibitory clause of the latter Act respecting the shipment of unfit horses shall be extended to include any horse unless certified by a veterinary inspector to be capable of being worked without suffering. It further empowers a veterinary inspector to cause to be slaughtered, whether the owner consents or not, any horse examined under the principal Act, and found by him to be in such a physical condition that it is cruel to keep it alive, or to be permanently incapable of being worked without suffering. The new Act took effect on October 1, 1914.

The Royal Proclamation of August 3, 1914, relating, *inter alia*, to the prohibition of the exportation of animals suitable for use in war had, however, the effect of bringing the trade in horses, including that in worn-out horses, to an end, and all arrangements for the veterinary inspection of horses at the port of embarkation were cancelled. This position continued until the end of the year, and the Act has not yet come into effective operation.

As regards the trade to Holland, the figures as to the number of horses exported to Amsterdam for slaughter during the seven months in which this trade was able to be carried on show a

slight increase over the total number exported to that port for slaughter in 1913, the figures being 2,552, as against 2,494.

Out of a staff of fifty-eight non-professional inspectors, as many as seventeen were engaged on military duties during the latter part of the year under review, and it may not be unfitting to put on record that two of these officers have already been killed in action. It has not been possible to provide for the duties of these inspectors by resort to temporary appointments, so that the burden which has fallen on the residue of the staff has been a heavy one, and at times it has been difficult to make adequate provision for the prompt performance of the more urgent duties arising from day to day.

Correspondence.

THE ARMY VETERINARY CORPS' COMFORTS FUND.

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—On behalf of the officers, N.C.O's., and men of the Army Veterinary Corps serving with the Expeditionary Force in France, I desire to thank all members of the veterinary profession and their friends who have so generously contributed by subscription and in kind to the Army Veterinary Comforts Fund, and in other ways have so kindly assisted in adding to the comfort and well-being of the men of the Army Veterinary Corps during the very trying winter through which they have passed.

It is needless for me to say how much the gifts have been appreciated. The gratitude of all ranks cannot be sufficiently expressed, but the kindness of the many contributors will certainly be remembered for all time.

I am particularly asked to express their pride in the fact that it is the profession to which their corps belongs that has so greatly contributed to their comfort and enjoyment.

I trust you will kindly convey, through the medium of your paper, this message of thanks and appreciation to all.

I am, yours very truly,

J. MOORE,
*Director of Veterinary Service,
Expeditionary Force.*

VICTORIA VETERINARY BENEVOLENT FUND.

THE quarterly meeting of the above Fund was held at 10, Red Lion Square, London, on Thursday, April 8, 1915, at 5 o'clock.

There were present: S. H. Slocock, in the chair; Sir Stewart Stockman; Messrs. Banham, W. Freeman Barrett, G. H. Wooldridge, William Shipley (Hon. Secretary), and others.

The minutes of the previous meeting having been taken as read, the Secretary presented his quarterly report, as follows:—

SECRETARY'S QUARTERLY REPORT.

In presenting my quarterly report I must first of all refer to our financial position.

Thanks again to the help of our old subscribers, I feel we are in such a condition that we can meet any immediate claims on our Fund. We are not, however, in the position to increase any of our present grants. I feel that owing to the loss of members due to military exigencies we shall be fortunate to keep up our old grants. We are slowly but surely getting others to become members and step into the breach. There is, as everyone knows, a wave of charity over the country, a few eddies of which ripple over the veterinary profession. I am able to add a list of new members, and to show that several of our members have increased their annual subscriptions; but in some cases memberships have lapsed (some through death, some through absence on military duties), and in a few cases helpful subscriptions have had to be reduced. I still hope that with those members of the profession who are increasing their subscriptions in other directions the needs of the Fund will not be overlooked.

I would like to note the fact that we are getting subscriptions and donations from ladies. This is especially interesting to me, as it indicates that the ladies of the profession are becoming interested in our work, and are obtaining some knowledge of the existence of the Fund. This is, I think, desirable.

I must ask the members of Council, if I am not able to give as much time to the work as previously, to understand that I have not the adequate time at my disposal, and would like to ask if some remuneration could be given for clerical services. The correspondence simply overwhelms me, and were it not for the services of a shorthand clerk it would be impossible for me to continue in my dual office of Secretary and Treasurer.

I recommend that all the old grants be continued until the time arrives when we can increase them. I am glad to report I have no fresh applications.

I have been able to get the nomination of Lawrence B. Farr accepted by the London Orphan School. The soliciting cards have been printed. I shall be happy to send a list of subscribers to the London Orphan School, and also a supply of cards, to any member of the profession who will endeavour to secure the election of this boy, of whom I get most encouraging reports from the medical attendant and the master of the school he now attends.

I submit a report from Mr. J. B. Wolstenholme, of the grants made by the National Veterinary Benevolent and Defence Society, by which you will see there is no overlapping, but co-operation in the grants given in at least two cases.

LIST OF NEW SUBSCRIBERS SINCE LAST QUARTERLY MEETING, JANUARY 7, 1915.

	£	s.	d.
Bushman, G. A., Islington	2	2	0
Baird, J., Dumfries	1	1	0
Buckingham, H., Norwich	0	10	0
Border Counties Veterinary Medical Society, Edinburgh	5	5	0

	£	s.	d.
Frood, J. Lamb., Board of Agriculture	1	1	0
Bornby, H. S., Rhodesia	2	2	0
Hoare, E. Wallis, Cork, Ireland	1	1	0
Hunting, C. S., Loughborough	1	1	0
Jones, H. L., Portuguese East Africa	1	1	0
Leach, E. H., Newmarket	2	2	0
Lawson, E. J., London	0	10	0
Marshall, A., Dartmouth	0	10	6
McKerlie, J., Hungerford	2	0	0
Moore, R. C., Leicester	0	10	6
Moody, J. F. B., City of London Yeomanry	0	10	6
Murray, R., Rugeley	0	10	6
Newsom, G. E., Wicklow, Ireland	1	1	0
Nisbet, J. B., Fence House, Durham	5	0	0
O'Dea, A. F., Belclare, Tuam, Galway	0	10	0
Pollard, H., Wakefield	0	10	6
Paton, H., Stevenage	1	0	0
Thomas, Lieutenant W. H., Army Veterinary Corps	0	10	6

LIST OF DONATIONS RECEIVED SINCE LAST QUARTERLY MEETING,
JANUARY 7, 1915.

	£	s.	d.
Bowes, Mrs., Leeds	0	10	6
Berry, Holman, Board of Agriculture	0	10	6
Berry, Holman, Board of Agriculture (special)	1	1	0
Bazley, F., Devizes	1	1	0
Dollar, J. A. W., London, W.	5	5	0
Gofton, A., Edinburgh	0	10	6
Price, T. Salisbury, London	5	0	0
Smart, W. W., Board of Agriculture	1	0	0
Stuart, Mrs., Hove, Brighton	0	10	0
West, E. Alfred, "Cinema" Fund	5	6	6
Wilkinson, G. C., Newcastle	2	2	0
Stephenson, Clement	21	0	0
Heatley, Mrs. T. G., Woodbridge	2	0	0
In Memoriam, J. S. and A. R. S.	2	2	0

It was proposed by Mr. Wooldridge, and seconded by Mr. Banham, that the Secretary be empowered to pay for clerical assistance at the rate of 2s. 6d. per week. This was unanimously adopted.

It was proposed by Mr. Barrett, and seconded by Mr. Banham, that a subscription of one guinea for the year be paid to the Charity Organization Society, with the view of co-operation.

The President presented a cheque, value £10 10s., from the Eastern Counties Veterinary Medical Society, and a donation of £1 from Mr. W. Anderson.

The Secretary was instructed to write a special vote of thanks for the kind donations.

The usual vote of thanks concluded the meeting."

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.



THE LATE LIEUTENANT-COLONEL J. EDGAR D. HOLMES,
C.I.E., M.A., D.Sc., C.V.D., M.R.C.V.S.

THE VETERINARY JOURNAL

JUNE, 1915.

THE LATE LIEUTENANT-COLONEL J. EDGAR D. HOLMES,
C.I.E., M.A., D.Sc., C.V.D., M.R.C.V.S.

OUR profession has sustained a very great loss by the death of Lieutenant-Colonel Holmes, the Imperial Bacteriologist at the Muktesar Laboratory. His death was due to cerebral hæmorrhage. He was born in 1867, and was the son of the Rev. John Holmes, of Tipperary. We have few men eminent in veterinary research, but Lieutenant-Colonel Holmes was one of them. As a scientist he had a wide reputation and his work at the Muktesar Institute has been invaluable. From the Grammar School at Tipperary he proceeded to Trinity College, Dublin, where he graduated in 1890. Some years later he took his M.A. degree, and in 1905 was made a D.Sc. for distinction in research work. He was appointed to the A.V.C. in 1895, and after four years' service, part of which was spent in India, transferred to the Indian Civil Veterinary Department. After serving as a Superintendent in the Department, he became Assistant Bacteriologist at the Muktesar Laboratory in 1901. During 1904-1906 he was deputed to Europe in order to take a post-graduate course of study, and on his return to India was appointed for a brief period Professor of Sanitary Science at Punjab Veterinary College, Lahore. In September, 1907, he became Imperial Bacteriologist to the Government of India, and was placed in charge of the Muktesar Laboratory, a position he had occupied ever since. His valuable research work in veterinary science won for him the Steel Memorial Medal in 1912, and in the following year the decoration of the C.I.E. was conferred on him. He was the author of a book called "Bazaar Drugs," and of a description of the Muktesar Laboratory and its work, which was published in three editions, in English, Urdu and Hindu, and of a great number of pamphlets and articles of scientific interest.

Lieutenant-Colonel Holmes was a keen supporter of the turf and the owner or part owner of several race horses which have often been seen at Calcutta, Lahore, and other race meetings.

His death at the early age of 48 is a serious blow to veterinary science ; he had conducted much original research into cattle diseases in India, and was responsible for the preparation and issue of various sera from the Muktesar Laboratory. He was a specialist of great ability and was wholly devoted to his work, which had already been productive of marked results and was beginning to have a world-wide reputation.

Editorial.

ON THOUGHT.

DULL monotonous routine is the arch enemy of all progressive thought. The action that is more the outcome of habit than anything else will never lead us beyond a certain distance, often an unsatisfactory and faulty one. The way to the achievement of a result undertaken in a certain manner because it has always been carried out in this one and the same fashion, may be indirect and round about, not nearly the best, and occasion much unnecessary effort. Thought tends ever to improvement in action and methods of procedure. Well directed thinking may even effect betterment in the tools and instruments used in action. If we do a certain thing in a machine-like manner any deficiency in our method of doing it will not be apparent to us. The defect must be thought out and sought out. A book supplies us with reading material, but just to read it without thinking about what we have read is, as one writer has put it—"simply insulting the author." A volume on a subject in which we are interested, if intelligently and thoughtfully perused, will always do us good. It may open the mind's eye to a new vista and throw a beam of light on a dark place.

In the days of our youth we often think about puzzling cases we meet with in practice. Do we always meditate as much about our material and what we have been doing in connection with it as we get older ? We fear there is a leaning with advancing years towards a spirit of fatalism as regards much of our work, and yet if we are to keep fresh and do our best, effort, alertness of mind and hope must ever be our special attributes and companions. Earnest thought

will be the tree from which such fruit will arise. In no branch of science is the faculty of meditation more necessary than in that of research. The very essence of success in inquiry into obscure and doubtful questions is born of acute thought and reasoning—laborious careful investigation into the problems of disease necessitates liberal expenditure of brain power and intellect. We could write much here about the indifferent encouragement of scientific research in this country and the inadequate reward for its successful and valuable achievements, but it will be noted by the observer that this land is suffering now from its neglect, and will continue to be punished until it looks at the matter in a broad-minded, liberal and intelligent way. Research, whether in chemistry, in manufacturing processes, in the problems of disease will bring a sure and certain reward (if not primarily to the individuals concerned) to the nation, and hardly enough money can be expended on it. To be dependent on foreign lands for valuable chemicals and for manufacturing essentials is not a fact resulting from true economy or discerning foresight. To check pathological conditions that occur is not such good procedure as to prevent them arising. When half the money and effort expended on curing and treating disease is devoted to its investigation and annihilation then thought will come into its kingdom and advance all along the line will be heralded.

The Britisher has ever been one to do things rather than a type of man to think about them before doing them. He frequently confuses effort with action. Nevertheless there are fine minds here capable of getting the best out of research if they are only adequately encouraged and led in the right direction.

Within recent years in our own fields of everyday practice two changes of methods of treatment have occurred almost imperceptibly as the result of man's thought and action. We refer to the treatment of milk fever and that of wounds. Without Schmidt the Dane and his thought we should probably have gone on treating milk fever for untold years with chloral, whisky, or ammonium carbonate; and without the meditation and action of some other men, brought about chiefly by the necessities of the situation, we should have continued to wash fresh wounds copiously with water, generally unclean, until the crack of doom, because tradition so dictated, and our fathers and forefathers did so before us. We have tried here to indicate the value of thought in bringing about scientific progress and improving our work, and we think we cannot do better than close by quoting some

lines we recently read and paraphrasing them somewhat : " Perfection in the treatment of disease and in surgical methods ought always to be the aim, but it is an ideal impossible of full attainment. There is, however, always material and to spare to give the worker ' furiously to think.' "

G. M.

ROUMANIAN HOMAGE TO FRANCE.

THE following address, signed by all the members of the teaching staff of the Veterinary School of Bucharest, was received recently by the French Veterinary School :—

TO THE DIRECTORS,—The reopening of our Superior School of Veterinary Medicine takes place this year amidst very tragic events caused by the cruellest and most unjust of wars that has ever occurred. In commencing our studies our first thought has been for France, that inexhaustible source of genius in all the sciences, and which has created particularly the scientific teaching of veterinary medicine. We have always recognized the great part which your magnificent schools have played in the preparation of our teaching bodies, and in the general progress of veterinary medicine in our country.

Permit us, therefore, to express to you at this moment, when your Motherland is the victim of a totally unjust aggression, our sentiments of profound sympathy, of gratitude, and of admiration, and to share with you your mourning, your sadness, and your hopes.

Our most ardent wishes are for the complete victory of the French armies, which to-day, as formerly, are defending with unequalled heroism not only their country, but also the principles of right, of liberty, of human dignity, which constitute the most precious treasure of our civilization.

Hurrah for France!

Hurrah for French genius, which for many centuries has not ceased to enlighten the entire world.

There follows the signatures of a number of the most distinguished of our Roumanian *confrères*.

General Articles.

THE EVOLUTION OF THE HORSE—A ZOOLOGICAL STUDY.

ATAVISM OF PORTION OF THE APPENDICULAR SKELETON OF THE HORSE.

By FRED. C. MAHON, M.R.C.V.S.

3, Arlington Gardens, Chiswick, London, IV.

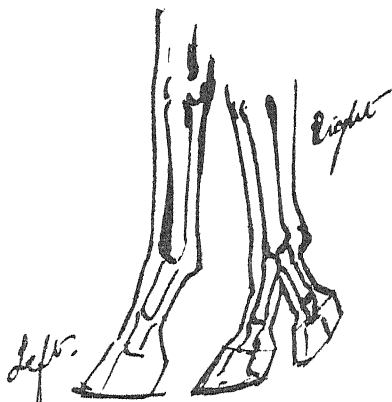
IN introducing the subject of atavism in the horse, I beg to refer my readers to the *Veterinarian* for December, 1886, wherein occurs the following statements by J. Gresswell, Esq., entitled "The Evolution: Hypothesis," especially in regard to its bearing on pathology. This able writer adds: "Reversionary processes serve also to explain other irregularities of structure." To E. Haeckell's law, the "*Lex Hereditatis interruptæ*," are referred cases of atavism, of which alternation of generations is regarded as a physiological, and gout as a pathological example. The application of the law may be extended to indicate cases of reversion to a long-lost ancestral trait. . . .

The cases of supra-scapular developments recently brought before the Royal Medical and Chirurgical Society of London by Mr. Willett, Surgeon to St. Bartholomew's Hospital, and Mr. W. T. Walsham, Assistant Surgeon to St. Bartholomew's Hospital, were similarly regarded. Mr. Charles Gresswell, M.R.C.V.S., of Nottingham, informed W. G. Gresswell, Esq., that he recently saw a foal which presented a tridactyle foot. The latent splint bones were almost as largely developed as the cannon bone, and each was provided with pastern bones and a hoof. How clearly this points to the ancestral condition presented by the Eocene *Eohippus*, the Miocene *Anchiterium*, the Pliocene *Hipparion*. Again, Mr. Brodie Gresswell, M.R.C.V.S., Louth, recently showed me the leg of a foal in which the only development of bone below the hock was a small nodule in the position of the proximal part of the metatarsal. The dam had suffered for some years from stiffness of all joints below the

corresponding leg. There have also been cases of a similar nature in man. The former laws illustrate the importance of reversionary processes, while the last illustrates the more direct importance of incident forces.

On pp. 238-239 of the April number (*Veterinarian*, 1887) is a splendid authenticated example of "atavism" in a thoroughbred mare named Pincushion Jenny, who in her racing career proved a superior performer (see *Racing Calendar*, 1822-23). At three years old her transformation of nature commenced, the extra off hind leg, which is handsome and perfect, began to appear next her near hind leg, and afterwards her off fore leg, and at this time there is one making its appearance down the near fore leg.

Reviewing this case as a singularly interesting one, I was



constrained for years past to endeavour to ascertain the whereabouts of any existing horse showing reversion to an original type, and by accident was asked one day in November, 1892, to see a nine-year-old chestnut mare, the property of Mr. P——, travelling showman, who seemed very reluctant to have her examined. I ascertained afterwards that he was of opinion that if the fact of such a curiosity got mooted abroad a stop would be placed on his exhibition of the mare. Being interested, I telegraphed to my friend, Mr. H. C. Wilkie, F.R.C.V.S., F.Z.S., who kindly sketched the mare.

Unfortunately, I have since lost the drawing, otherwise I should have had same reproduced for the readers of THE VETERINARY JOURNAL to inspect. However, I append a sketch

roughly penned to illustrate this interesting case. The owner, I may add, says the supernumerary structures began to appear when the mare was just over five years old, and recently appeared to have reached its limit of extension. The hoof of the phalanges came to within a few inches of the ground, and was shod with a copper shoe, as the owner told me at the time. for "luck."

I desire to remind my readers that there are two interesting portions of the originization of existing horses, viz., their structure and the past history of the race as revealed by fossil remains, by far the most interesting from the former point of view being the parts which are rudimentary and apparently useless, structures occurring in several parts of the body corresponding with others which are fully developed in size, or altered in character so as to be of little if any use in its economy.

As Darwin says, they may be compared with the letters of a word still retained in the spelling, but become useless in the pronunciation, which serve as a clue to its derivation (as, for example, the "b" in "debt" and "doubt." Again, if we touch upon the important subject of specialization, we see (1) the addition of parts not met with in the generality of animals, and, as far as is known, not found in the earliest members of the groups which afterwards possess them, as, for example, the antlers of deer, the horns of oxen or the rhinoceros; (2) the suppression of structures commonly present, as the upper incisor teeth of ruminants, the tails of bears, guinea-pigs, &c., the extra toes of the horse, the extra limbs of porpoises, &c.; (3) the modification of the form, size, or relation of parts, as the immense development of the canine teeth in the walrus and male musk deer, the complicated foldings of the molar teeth of elephants, &c.

To understand the natural position of the horse in the zoological system, it will be necessary to take a wide glance at the whole group to which it belongs. That it is a vertebrate animal, and that it occupies a place in the class Mammalia no one will doubt. In this class it belongs to the great order "Ungulata," or hoofed animals, the principal characters of which are the following: They are all eminently adapted for a terrestrial life, and, in the main, for a vegetable diet. Their molar teeth have broad crowns, with tuberculated or ridged grinding surfaces, and they possess a completely developed set of milk teeth. Their limbs are adapted for carrying the body in ordinary

terrestrial progression, and are of very little use for any other purpose, such as flying, climbing, seizing prey, or carrying food in the mouth. They have, however, no collar-bones; their toes are provided with blunt broad nails, which in the majority of cases more or less surround and enclose their ends, and are called "hoofs." The great majority of ungulate animals belong to either one or the other of two great and perfectly distinct sections, the most obvious of these being the character of their limbs, from which the names of the groups or sub-orders are derived; one of these called Artiodactyla, or "even-toed," the other Periosodactyla, or "odd-toed." In the former the third and fourth toes of both hind feet are almost equally developed, and altered on their inner or contiguous surfaces, so that each is not symmetrically developed to a line between them, the so-called cloven hoof. These two toes are always present and well-developed; the second and fifth may be present in varying degrees of development, or may be entirely absent. The first is not present in any known member of the group, even the most ancient.

It may safely be premised that few, if any, original workers at any branch of biology appear now to entertain serious doubt about the general truth of the doctrine, that all existing forms of life have been derived from other forms by a natural process of descent with modification, and it is generally acknowledged that to the records of the past history of life upon the earth we must look for the actual confirmation of the truth of a doctrine which accords so strongly with all we know of the present history of living beings. Professor Huxley wrote in 1875: "The only perfectly sure foundation for the doctrine of evolution lies in the historical, or, rather, archæological evidence, that particular organisms have arisen by the gradual modification of their predecessors, which is furnished by fossil remains." This evidence is daily increasing in amount and in weight, and it is to be hoped that the comparisons of the actual pedigree of these organisms with the phenomena of their development may furnish some criterion by which the validity of phylogenic conditions deduced from the facts of embryology alone may be satisfactorily tested.

Palæontology, however, reveals her secrets with no open hand. Witness the discovery towards the end of 1889 by Professor Marsh of numerous mammalian remains from formations

of the cretaceous period, the existence of which for so long had been a source of difficulty to all zoologists. Reviewing the necessary imperfections in records to hand, and taking an impartial survey of the real progress of palæontological discoveries, can we doubt that the evidence in favour of a gradual modification of living germs is still rapidly increasing?

Any regular progressive series of changes of structure coinciding with changes in time can, of course, only be expected to be preserved, and to come again before our eyes under such favourable combination of circumstances as must be of rare occurrence; but the links, more or less perfect, of many such series are continually being revealed, and the discovery of a single intermediate form is often of immense interest as indicating the path along which the modified form, one apparently distinct from another, may have taken place.

It is generally recognized that it is one of the main elements of Darwin's, as well as of every other theory of evolution, that there is in every individual organic being an innate tendency to vary from the standard of its predecessors, but that this inclination is usually kept under the sternest control by the opposite tendency to resemble it. These opposing forces are termed heredity and atavism.

Authorities worth quoting relative to "atavism" are Sir Arthur Mitchell, K.C.B., on "Blood Relationship in Marriage considered in its Influence upon the Offspring"; Darwin, "On the Descent of Man," 1885, also "Origin of Species," first edition; "Factors of Organic Evolution," nineteenth century (1886); "Darwinism," p. 443, London, 1888; "Philosophic Translations," 1881; Darwin, "Animals and Plants under Domestication," first edition, pp. 403, 886; Essays by Professors Harvey and Gusserow, and Mr. Savory; Sir W. Turner, M.B., LL.D., "Lectures on Comparative Anatomy of the Placenta," Edin., 1876.

My wish in penning this article is not to pose as an authority on the subject of atavism, but to place on record a brief account of what was to me, and I trust will be to others now, of interest.

DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS OF
FOOT-AND-MOUTH DISEASE.

By D. H. UDALL.

Ithaca, New York.

Diagnosis.—The diagnosis of foot-and-mouth disease in cattle is not difficult when the disease is seen at its height in several animals. The chief diagnostic symptoms are the lesions in the mouth and around the feet (coronary border, between the claws), the rapid course reaching its height in three to five days; the rapid extension to all the animals in the herd; its extension to other species (swine, sheep), and the ease with which it may be transmitted to healthy young cattle by bringing virus in contact with abraded mucous membranes of the mouth. The lesions in the mouth are unlike those of any other form of stomatitis. In the very first stages the blisters in the mouth are small (vesicles); in two or three days they spread rapidly and rupture, so that the mucous membrane of the upper and lower lip may be nearly covered with a red granular surface, over which is deposited a yellowish necrotic mass, which has been in part removed. Similar lesions 1 to 2 in. in diameter may also appear on the dorsal surface of the tongue. The rapid loss in condition, drooling of the saliva, smacking of the lips, lameness, and the inability to eat complete the very characteristic and unmistakable symptoms of the contagion.

Differential Diagnosis.—The differential diagnosis of foot-and-mouth disease may become difficult when it occurs in an atypical form, when the lesions are slight (mild attack), or nearly healed, or when recovery has taken place and there remain only a few scars in the mouth. Other infections may then so closely resemble it that a positive diagnosis cannot be made by the physical symptoms alone. In such cases it is important to establish the contagious character of the disease by bringing salivary secretions or other suspected material in contact with the abraded oral mucous membranes of young healthy cattle. Should symptoms develop therefrom, the contagiousness and the character of the lesions may be further observed by repeated transmissions. Because of the short period of incubation and the very acute course of the disease the time required to complete such an experiment is short, and in doubtful cases the results

may be more conclusive than those derived from a physical examination of the original animals.

The first cases in an outbreak are liable to be wrongly diagnosed, because under normal conditions the disease is not present in this country. Since the nature of the virus is such that infection may occur in any part of the U.S. or Canada at any time, the importance of an early positive diagnosis of mouth affections in cattle is obvious.

In a restricted sense, the term "aphthous stomatitis" means foot-and-mouth disease; numerous other forms of aphthous stomatitis occur in cattle and other animals, and present very similar symptoms, but lack the specific characters that mark the true form. These have been variously named, according to their resemblance to the specific contagious form—pseudo foot-and-mouth disease, pseudo mouth-plague, according to the lesions—ulcerative stomatitis, erosive stomatitis, follicular and papillary stomatitis, vesicular stomatitis, and, according to the supposed cause, mycotic stomatitis. Marek includes all of these forms under the general heading of aphthous stomatitis, since this term (aphtha—a little ulcer) corresponds to their anatomical characteristics. He defines aphthous stomatitis as an independent infectious or toxic disease in which dead epithelial and fibrinous deposits form upon the oral mucous membranes. Foot-and-mouth disease is most liable to be mistaken for some of the following other forms of aphthous stomatitis.

(1) *Sporadic aphthous stomatitis*, erosive stomatitis, pseudo foot-and-mouth disease, mycotic stomatitis, misnamed vesicular stomatitis. This is a sporadic non-contagious disease thought to be due to infection, or to irritant chemical products (moulds, fungi, clover). It occurs chiefly in cattle, and is characterized by necrotic patches on the muzzle, lips, and the mucous membranes of the mouth; there may also be an inflammation of the coronary tissues of the feet, a papillary eruption of the skin on various parts of the body, and irregular necrotic patches on the teats. Punctiform yellow or grey necrotic spots appear either on the muzzle or margins of the lips, or on the mucous membranes of the lips, cheeks, gums, and tongue. These necrotic areas are small, round, or oblong in form, $\frac{1}{8}$ to $\frac{1}{4}$ in. in diameter, have a well-defined margin, are deep or superficial, and in some cases have an "eaten in" appearance. The areas may be covered with

a thin yellowish or greyish deposit, much thinner than that of foot-and-mouth disease, underneath which one finds a dark-red sensitive bleeding surface.

The necrotic spots may spread slowly and fuse into one another, thus presenting a diffuse, rough, moist, yellowish surface. When they are few in number the course is mild and short (ten to fourteen days); when numerous the course may be severe, extend into weeks, and terminate in death. Salivation, smacking of the lips, inability to chew, and lameness may be present, as in foot-and-mouth disease. Fever is absent unless complications develop. It cannot be transmitted from animal to animal.

The following two case descriptions illustrate the chief symptoms of sporadic aphthous stomatitis:—

Case No. 1.—About October 1, 1914, a two-year-old Holstein heifer in a pasture with six other young cattle was noticed by the owner to have a yellowish spot on the muzzle; this spot gradually increased in size, nasal discharge and salivation appeared, and the animal lost in condition. On October 20, when presented at the clinic of the New York State Veterinary College, she presented the following symptoms: Condition fair; slight depression; not inclined to move about; the hair dry and rough; and the skin over the back and loins covered with a papillary eruption; mucous membranes slightly pale; temperature 101.4° F.; pulse 54; respirations 10. Salivation was marked; both nostrils discharged a yellowish-white mucilaginous secretion; there was a pronounced smacking of the lips; the muzzle was lemon-yellow in colour, moist, and roughened; on closer examination it was found to be completely covered with small necrotic spots that gave it the general appearance of a diffuse moist gangrene. On the mucous membrane of the lips, gum, and tongue were several small, slightly depressed spots from the size of a millet-seed to that of a pea, presenting a greyish surface; on removal of the superficial layer there remained a dark-red, very sensitive bleeding surface. The appetite was nearly absent, so that the only nourishment taken was a small amount of oatmeal gruel. The contractions of the rumen were weak and reduced to one per minute, the peristalsis weak, the evacuations from the bowels were slight, dry, and black, and covered with mucus. Around all four feet at the coronary region was an inflammation of the

skin with the formation of scabs. On November 4 the depression was marked, the back arched, the condition poor, the mucous membranes of the mouth very red, the gums were swollen, the skin had commenced to separate from the hoofs at the coronets, there was a knuckling of the hind fetlocks, the fæces were thin and fœtid, and the temperature 103° F. Death followed on November 18, and the autopsy made upon a very emaciated cadaver presented, in addition to the lesions already described, the following appearance: The dorsal surface, sides, and base of the tongue were covered with numerous black necrotic patches; the mucous membrane of the pharynx was thickened and covered with yellowish granular elevations that, upon pressure, appeared to squeeze out of lymph follicles; the mucous membrane of the œsophagus was covered with superficial ulcers; the large and small intestines were very much inflamed; in the cæcum and colon the mucous membrane was thickly studded with reddish elevations $\frac{1}{8}$ to $\frac{1}{4}$ in. in diameter, so that it presented a reddish, mottled appearance; the contents of the bowels appeared to be mucopurulent.

Case No. 2.—On November 7, 1914, a young cow in a stable with about twenty others, near Ithaca, was suspected by the owner to have symptoms similar to those of foot-and-mouth disease. On examination the cow was found to be slightly depressed, the hair was somewhat erect and roughened, and the temperature normal. On the inner surface and margin of the lower lip were about half a dozen deep erosions, the largest not more than $\frac{1}{4}$ in. in diameter; they were partly round, partly elliptical in form, the surface was dark, and they did not appear to be painful. Scattered over the teats were several reddish elevations that were similar to the scabs of cow-pox. No other symptoms were noted.

(2) *Aphthous Stomatitis in the Young* (foals, calves, lambs).—Small necrotic spots covered with a yellowish membrane appear on the skin of the lips or the oral mucous membranes, especially on the tongue and gums. The mucous membranes of the mouth are very red. In very young animals the death-rate is high. Several individuals in the herd are usually affected, but it is not yet established that the disease is contagious. This affection is not liable to be confused with foot-and-mouth disease.

(3) *Contagious Papillary Stomatitis in Cattle*, follicular

stomatitis (Hess), papillary stomatitis (Degive).—This is described by Hutyra and Marek under the general heading of aphthous stomatitis, as a specific, infectious, non-febrile disease caused by an ultra-visible micro-organism. Flat nodules, from the size of a mustard-seed to that of a lentil, appear on the inner surfaces of margin of the lips, beneath the tongue, and on the cheeks; these nodules may fuse to form larger areas. The spots are at first grey, afterwards red, and surrounded by a zone. Absence of large vesicles, or extensive granulating areas, and of lesions on other parts of the body (feet, teats) serve to differentiate it from foot-and-mouth disease. So far as we know this disease has not been described in this country.

The symptoms of other inflammatory conditions are more uniform and present more definite characteristics.

(4) *Stomatitis Vesiculosa* is described as occurring on the gums and interdental spaces of the upper jaw. The small vesicles are soon replaced by a greyish, thin, flat deposit; there is no fever and it is not contagious. The symptoms are mild.

(5) *Traumatic Stomatitis* and injuries to the cheeks from sharp objects in the food, grain awns, &c., may leave scars similar to those of healed cases of mild foot-and-mouth disease. Traumatic scars are usually irregular, linear, and deep.

(6) Foot rot, fouds, suppurative cellulitis in cattle and sheep sometimes extends to all the animals in the herd, and suggests the nature of an infection. There is also a contagious enzootic foot rot in sheep. In foot-and-mouth disease the feet are usually all attacked at the same time and the infection spreads rapidly from animal to animal, the lesions are more superficial (blisters), and the recovery more prompt.—*The Cornell Veterinarian*.

General Clinicals.

SUPPURATION FOLLOWING LYMPHANGITIS IN THE HIND LIMB OF THE HORSE.

By J. F. D. TUTT, M.R.C.V.S., F.R.M.S.

Winchester.

THIS case seems to be so extraordinary that I considered that it would be well worth recording, as it is typical of not a few that have come under my notice recently.

USUAL HISTORY OF THE CASES.

In most cases the usual history has been an influenza cold or "catarrh," followed by lymphangitis, which, when gone, or practically gone, is followed by numbers of suppurating "buds" that are usually slow in healing. The limb that has been involved in practically every case has been the off hind. Sometimes the suppuration has started high up inside the thigh, at other times it has started round the fetlock (Case 2, p. 224, of the May issue of this Journal is an example).

Reaction to the mallein test has been negative in each case. Microscopically, cocci have been found; no cryptococci have been found, thus excluding the possibility of the cases being those of epizootic lymphangitis.

Nature of the Discharge.—In some cases the pus has been of the "laudable" or creamy type; in other cases it has been sanious and oily. Before the introduction of the mallein test the case about to be described, like others, would no doubt have been diagnosed as glanders and the animal destroyed. In some cases no illness has occurred until the suppurating buds have appeared (as in Case 3, p. 225, May issue of this Journal, and in the case recorded in the April issue by me). In Case 2 (p. 224, May issue of this Journal), the only symptom previous to the appearance of the "buds" was lameness of an obscure nature.

Duration.—Usually prolonged, with marked loss of condition on the part of the patient.

Subject.—Brown cart mare.

History.—I first saw this case on January 7 last. The symptoms then present were those of the usual type seen in ordinary lymphangitis," or "big leg," the enlargement involving the off hind limb.

I prescribed potassium iodide in 2 dr. doses three times a day, hand rubbing the limb, bran mash,es, &c., and had the animal turned into a loose box. Later the usual diuretic balls of resin and potassium nitrate were given twice a day. No diminution in the size of the limb was noticed, and on January 13 three "buds" discharging pus and blood appeared in a row round the fetlock. Another one then appeared in the hollow of the heel, then two or three in the bend of the hock, then one inside the thigh, and so on, until the limb was covered with "buds" discharging pus and blood, and pus (laudable) only in some places. Microscopically, cocci could be seen; mallein tests (subcutaneous and ophthalmic) were both negative.

TREATMENT AFTER APPEARANCE OF SUPPURATION.

I first tried the effect of a stock vaccine of a combined staphylococcus and streptococcus nature. The only effect appeared to be an increase in the discharge. The doses, &c., given were:—

January 14.—100,000,000 organisms.

January 18.—300,000,000 ,,

January 22.—500,000,000 ,,

I then determined to try the effect of an autogenous vaccine, and took a swab from a recent "bud" and sent it to Professor Annett, who reported as follows:—

"Cultivations made from the material have yielded cultures of the following organisms:—

(1) *Bacillus pyocyaneus*.

(2) *Staphylococcus albus*.

(3) A diplococcus.

From these an autogenous vaccine has been prepared. Each phial sent contains 1 c.c., and has 8,000,000,000 organisms in all, made up of 2,000,000,000 of the first-named organism and 3,000,000,000 of the other organisms.

RECORD AND OBSERVATIONS.

Vaccine.

January 28.—First inoculation, $\frac{1}{2}$ c.c.

February 1.—Second inoculation, 1 c.c., or 8,000,000,000 organisms.

February 6 and 9.—Similar to that on February 1.

February 12.—24,000,000,000 organisms.

.. 16.—24,000,000,000 organisms.

.. 20.—24,000,000,000 organisms.

.. 24.—24,000,000,000 organisms.

March 2.—24,000,000,000 organisms.

.. 11.—48,000,000,000 organisms.

.. 16.—64,000,000,000 organisms.

.. 20.—64,000,000,000 organisms.

.. 26.—64,000,000,000 organisms.

Fibrolysin.

March 11.—10 c.c. fibrolysin.

.. 13.—10 c.c. fibrolysin.

.. 16.—10 c.c. fibrolysin.

.. 18.—10 c.c. fibrolysin.

.. 20.—10 c.c. fibrolysin.

.. 23.—10 c.c. fibrolysin.

.. 26.—10 c.c. fibrolysin.

On February 3 the mare got down and had to be put in slings.

A noticeable alteration in the amount of the discharge was observed about the middle of February, and ceased at the beginning of March.

Dense fibrous masses resembling papillomata now made their appearance about the fetlock, and increased in size up to that of a human fist. Fibrolysin was therefore injected into the gluteal muscles of the affected limb, and a marked diminution was observed in their size; the mare also gained in condition, and was let out of slings on March 30. The enlargements were ligatured on April 1, and the mare was discharged on April 27.

The mare was a valuable one, and the eventual successful recovery was very gratifying, although naturally prolonged, owing to the severity of the attack, &c.

A CASE OF ANTHRAX.*

By J. A. BENNETT, M.B., B.S.DURH.

Captain, Royal Army Medical Corps.

AN account of anthrax in man being comparatively uncommon, the following notes may be of interest to readers of THE VETERINARY JOURNAL:—

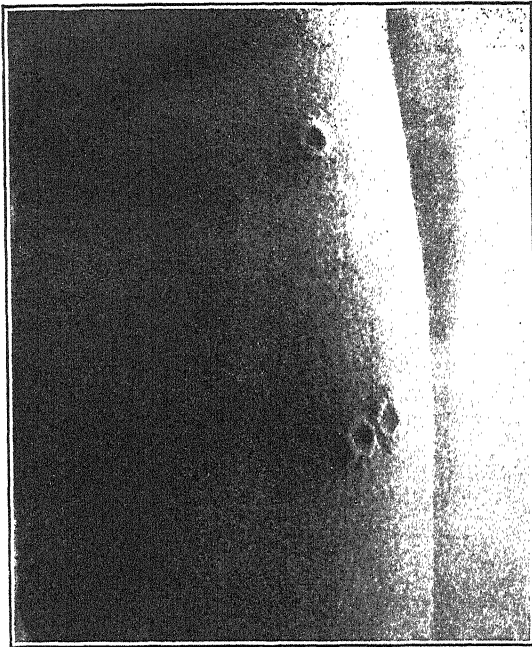
History.—A driver in the Royal Field Artillery, aged 30, was admitted to Connaught Hospital, Aldershot, with three pustules on his forearm. For about six months the patient had been working amongst horses and in stables, but had no recollection of having had any abrasions or the like. On March 3 he noticed three spots on his forearm, two close together 2 in. below the end of the elbow, and the other 2 in. nearer the wrist. He felt “out of sorts,” ascribing his condition to a cold, and it was on account of the latter that he reported himself sick on the 4th. The pustules had then the following appearance: small ulcers, $\frac{1}{4}$ in. in diameter (those shown in the illustration are slightly smaller than natural size), with elevated edges, the latter being due to small vesicles having coalesced and formed a complete ring surrounding a dry, depressed centre of a blackish-purple colour. Immediately outside this ring was an angry red area of about $\frac{1}{4}$ in., on which were minute discrete vesicles irregularly concentrically placed. The whole skin of the forearm was indurated and inflamed. There was no febrile or constitutional disturbance of note.

Treatment.—After examination of many cover-glass preparations stained with watery methylene blue made from the pustules no *Bacillus anthracis* were found, but as the appearance of the pustules was so suggestive of anthrax the patient was given an anæsthetic and the pustules were excised, including the vesiculated area. The raw surface left was cauterized with pure carbolic. Readily assimilated nutritious fluid nourishment and stimulants were given.

Bacteriological Examination.—Agar tubes and plates were inoculated with serous fluid aspirated from the pustules after excision, twenty-four hours’ incubation showing a rich growth of staphylococcus albus, which obscured any other growths which

* Reproduced by kind permission of *The Lancet*.

may have been present; incubation was continued for three days. A flask of normal saline inoculated with some of the dense growth by means of a glass rod, and the saline emulsion was then heated at 85° C. for thirty minutes and stroke cultures made on agar plates from the latter. Twenty-four hours' incubation of the agar plates showed numerous colonies of *B. anthracis*. To the naked eye and low-power examination the colonies were quite



Pustules on the forearm in a case of anthrax

characteristic. Examination under $\frac{1}{12}$ th in. oil immersion revealed the characteristic *B. anthracis*.

Convalescence has been progressive and the man has been discharged from hospital feeling very fit.

I am indebted to Temporary Lieutenant R. Francis Jones for carrying out the bacteriological work, and to Temporary Lieutenant D. J. Legge for the surgical work.—*The Lancet*.

SOME FURTHER NOTES INCIDENTAL TO PARTURITION

By RUSTICUS.

(Continued from p. 224.)

I.—ON April 8, 1910, I was called to an eight-year-old Shire mare which could not foal. The presentation was anterior with considerable lateral deviation of the head, and one hind leg also presented with the fore feet.

Embryotomy was performed and the mare apparently made an excellent recovery. On May 3 she did a little light work. On May 4 she was carting a small load of roots to the sheep; she stopped on a gradient, the farm lad struck her with a whip, she started forward and, in his words, "stuck her toes in the ground and then stood on three legs." I was called again to the mare on May 6. She was unable to place any weight on the off hind limb, was sweating, off her feed, and on the point of collapse. Examination *per rectum* revealed a large, very painful swelling on the right wall. Diagnosis: fracture of the pelvis.

The mare was destroyed: *post-mortem* examination showed fracture of the right innominate bone through the acetabulum, which was in three pieces. The bones of the pelvis were boiled, but I was unable to detect evidence of previous fracture of the right innominate bone. Were the fractures caused by muscular contraction at the moment the farm hand struck the mare with the whip, or did an unsuspected fracture exist and excessive muscular contraction cause a displacement which had been deferred?

II.—One has been generally led to believe that the bovine subjects of milk fever are deep milkers, easy calvers, and owned by good keepers; occasionally one becomes cynical, and experience teaches one that the exceptions to the rule are not so rare as we previously imagined.

These notes on a case are an illustration of an exception which occurred in our practice.

At 7 p.m. on June 5, 1913, we were called to a parturient cow in poor condition from which the owner, a small dairy farmer, and his man could not extract the calf.

On our arrival we found the man had managed to remove a fairly large sized calf in the breech position with flexed hocks which appeared ankylosed.

The cow appeared slightly exhausted,* but otherwise normal. Twenty-four hours afterwards we were requested to remove the after-birth because the cow was uneasy and the weather very hot; we did so, irrigated the uterus with a solution of lysol, and inserted a salol pessary. We left the cow quite comfortable. Thirty-six hours after she had been delivered the owner asked us to attend again as the cow had a severe attack of milk fever; treatment was on the usual lines, and recovery took place in eight hours.

My assistant up to that time had not heard of a case of bovine milk fever subsequent to dystocia.

MULTIPLICITY OF CASES.

By C. A. JOHNS, D.V.M.(1910).

ON October 10, 1914, late in the afternoon and after a rain-storm, a farmer called me to see eighteen of his cows which had become bloated on alfalfa pasture. On arrival at the farm ten minutes later I found two of the animals dead and the rest extremely bloated. One cow was in a very serious condition, down on the ground and apparently making her last struggle.

My treatment was as follows: The cow which was down and all but dead I operated by making with a scalpel an incision 4 to 5 in. long through the flank and rumen. Gas, alfalfa, water, &c., the contents of the rumen, fairly boiled through the opening. This ingesta was so hot that the hand could hardly be held in it. The other fifteen cows were operated by trocaring (one to five times). I also administered 1 dr. of salicylic acid to each cow. This was followed, after the bloating had subsided, by giving to each cow 2 lb. of sulphate of magnesia.

Results.—After about three hours the incision in the rumen of the cow operated with the scalpel was cleansed and sutured with catgut. The flank muscles were sutured with two rows of catgut and the skin with silk. All of the animals recovered without trouble except one case, which showed symptoms of impaction for forty-eight hours. These cows had been on alfalfa pasture for a few days, but until the rain came none of them developed any symptoms of disease.—*Veterinary Alumni Quarterly.*

CLINICAL CASES (MOSTLY UNSATISFACTORY).

By T. I. ALEXANDER, M.R.C.V.S.

*Kinsale.**(Continued from p. 222.)*

Case 3.—Called to a cow. Message received from small boy was that "Her insides were coming out." Inquiry as to what they required done elicited the mild request, "We want you to fix her."

On arrival I found her lying in a ditch with her entire womb everted and covered with filth. She, it appears, was due to calve and had lain down on this steep declivity with a drop into the ditch. Her head was facing up hill, and when the calf, which I understand was a big one, made its appearance three or four men made a grab for it. In this part of the country they do not believe in letting go until something breaks; the result was that they brought the womb (no doubt assisted by the weight of bowels behind and the expulsive efforts of the cow) out upon the grass. Examination, after remedying the position of the cow so that her head was facing down hill, revealed two ruptures in the everted womb, one about 3 in. and the other about 4 in. long, through which the intestines could be seen. As night was coming on, the cow having lost a lot of blood, and not being in an experimental frame of mind, I ordered her destruction. I believe she died before it could be carried out. *Moral:* Never calve a cow down a steep hill.

TUMOURS.

By T. I. ALEXANDER, M.R.C.V.S.

Kinsale.

I have been much struck by the comparatively enormous amount of malignant growths met with in the domesticated animals. I would be interested to know if the experiences of other veterinary surgeons are similar, and in this connection the following notes may be of interest:—

Case 1.—A horse losing condition, employed drawing timber and not belonging to this district, was brought to me with a request that I should "fatten him a little more." The foreman told me that another "vet" had rasped his teeth about a month before. Just as

I was preparing to do something of a similar nature, he asked me to look at a sore *under* the tongue. On examination the "sore" revealed itself as an apparently gradual destruction of tissue, situated at "frænum linguæ" in extent about 4 in. by $1\frac{1}{2}$ in., varying in depth. It had a malignant aspect, but there appeared to be an absence of any odour from the breath. I removed a portion of growth and forwarded it to Professor Mettam, who kindly informed me it was carcinoma. The horse was afterwards destroyed.

Case 2.—Called to see a cow with "a sore eye." On arrival I found that instead of an eye, which must have disappeared months before, its place had been taken by a large and truculent looking tumour. Owner informed me it seemed to be getting bigger.

Professor Mettam also examined portion of this for me and pronounced it carcinoma. On my informing the owner that it was malignant, and that nothing could be done except to slaughter the animal, he became very morose and appeared for some occult reason to hold me responsible for the appearance of the tumour. He revenged himself by not paying my fee for twelve months until threatened with legal proceedings.

Case 3.—A Great Dane dog which had been castrated a year before was brought for treatment. He had a tumour, about the size of a small hen's egg, situated midway on the right side of the neck and freely movable with the skin, and a slightly smaller tumour on the right side of prepuce and freely movable; there were several smaller tumours on the back not so freely movable, and one on the summit of the shoulders between the upper extremities of the scapulæ.

As owner did not wish any blood spilled I had to prescribe first. I gave liq. arsenicalis in 10 minim doses daily. After a week I noted as peculiar that *some* of the tumours had decreased noticeably in size, but others, which were not so pronounced at previous examination, had become enlarged. I decided to remove the one on the neck and did so with a local anæsthetic of cocaine hydrochlor. It was very adherent to the skin, and the next day the operation wound and tissues around had taken on a very unhealthy appearance. Professor Mettam informed me it was round-celled sarcoma, and the dog was chloroformed with the owner's consent.

Case 4.—A mare, whose owner said when requisitioning my services that "she had a lump on her tail." On arrival I found an old mare in poor condition and covered with "lumps" all over her body (I gave up when I had counted fifty). My client informed me

she had a "lump" on her tail two years before, but they got rid of it by docking the tail above. Growing on the end of her few remaining coccygeal vertebræ was the "champion lump," to which my client drew my particular attention. It was a large semi-solid suppurating tumour, and I came to the conclusion that all these growths were malignant and ordered him to destroy her; but true to the ritual of veterinary clients, he did not do so, but allowed her to die, which she eventually did from a "carcinomatous pneumonia," as I have no doubt that she must have been riddled internally with hundreds of tumours. Unfortunately, I was unable to make a *post-mortem*, which would have been interesting.

Carcinoma of a cat's eye, sarcoma of a cow's vagina, and carcinoma of a bullock's shoulder are other cases fresh in my memory.

Why should malignant growths be so common in animals in the country, living under practically natural conditions?

The decree concerning "the sins of the fathers" should not apply in the animal world.

Canine Clinical.

TWO DOG CASES.

By HORACE L. ROBERTS, F.R.C.V.S.

Ipswich.

IN the April number of THE VETERINARY JOURNAL there are recorded by Mr. G. Mayall two cases of toxæmic constipation in dogs, or canine typhus, and the treatment by salt-water rectal injections and medicinal liquid paraffin. The following notes of a trial of the "new" treatment may be of interest to your readers:—

(1) On April 27 I was requested to see an Aberdeen terrier dog, aged 10 months. He was dull and listless, breath foetid. The animal had not eaten anything for four days, nor had he passed any fæces during the same period.

I took him home with me, and gave him copious salt-water injections until he vomited a clear fluid. An hour afterwards he was given a teaspoonful of medicinal liquid paraffin, which was repeated in the evening.

On the 28th the dog was brighter, ~~breath~~ less offensive, but no fæces had been voided.

Paraffin was given in doses of one teaspoonful three times during this day. At 7 p.m. the dog was considerably better and drank some warm milk.

On the morning of the 29th we found he had passed some dark-coloured fæces of a pasty consistence. His appetite for fluids was now good. He returned home on the 30th quite convalescent. A small quantity of pethdar (a patent food for dogs) brought back his usual liveliness.

(2) On May 11 I was called to an eleven-year-old working terrier, which is now a house dog. He had been ill with a "stoppage" for two days. The owner, who is a successful dog-breeder, had given him several dessertspoonfuls of salad oil and two Dover's powders, but without any apparent result.

The usual symptoms of canine typhus were present *plus* a considerable amount of gastric tympany.

The treatment was salt-water enemata and one dessertspoonful of medicinal liquid paraffin three times a day.

On the 12th the animal was brighter and drank a little bovril and tea and milk.

On the morning of the 13th he had not passed any fæces. Above treatment continued.

During the night of the 13th he voided a large quantity of dark-coloured fæces of semi-liquid consistence. On the 14th the dog's appetite was maintained, but his general condition, on account of cardiac debility, was not quite satisfactory. I prescribed tr. strophanthus twice daily. The old dog made an excellent recovery. In this case salad oil and Dover's powders had been given, but the dog was rapidly becoming worse. The immediate beneficial effect of the salt-water enema was apparent to the owner and his kennelman, and after six doses of paraffin the dog had passed the crisis.

What is the effect of the internal administration of paraffin on the respiratory apparatus? In both these cases I noticed, even after the most careful administration, irritation of the laryngeal and tracheal mucous membranes which persisted throughout the course of treatment. Have any of your readers noticed a similar phenomenon?



EXTRACTS FROM A DIARY.

FROM DAY OF MOBILIZATION TILL LAST DAY OF THE
RETIREMENT.

August 4, 1914.—Orders to mobilize.

August 5, 1914.—First day of mobilization. I joined my brigade.

August 7, 8, 9, 1914.—Reservists all joined. Remounts arrived.

August 10, 1914.—Our first casualty, a sergeant being killed, kicked in head by a remount.

August 13, 1914.—Second casualty; one of our majors thrown from his horse and dislocated his shoulder.

August 14, 15, 16, 1914.—Preparing for move.

August 17, 1914.—Batteries started entraining.

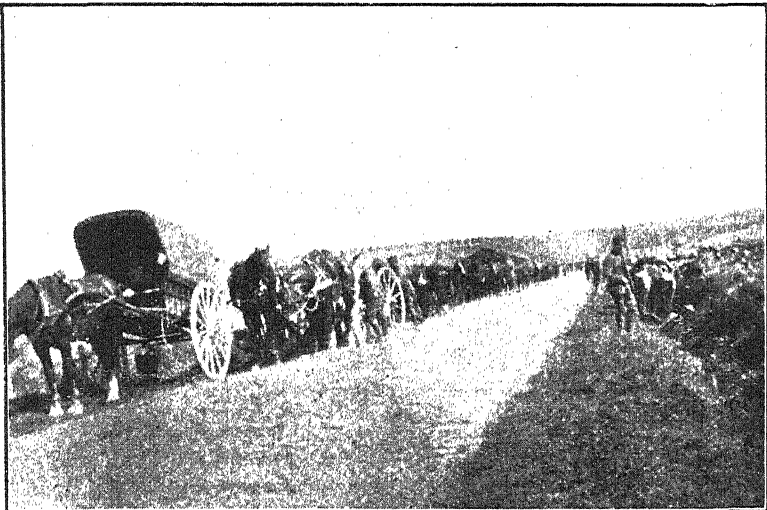
August 18, 1914.—Headquarter Staff, to which I was attached, marched to the station at 10 a.m. Great excitement through the town and at the station. All the guns and wagons were run on to trucks in no time, and the horses were very little trouble.

I helped box them, being only too glad of something to do. This was finished by 12 o'clock, and the doctor and I went to have a last drink for luck. Returning to the train about 12.15 we got into our carriage and found the Colonel had put in two luncheon baskets, a flask of whisky, and some soda for us. After sitting there for five minutes with crowds of men and weeping women just outside our carriage, the doctor and I decided to have another parting drink. On the way I saw the inspector and told him not to let the train go without us; five minutes later he came rushing into the refreshment room saying they were waiting for us, so we ran like hares through the crowd of people down the platform into our carriage under the eye (with the eye-glass) of our Colonel.

The journey to Southampton was uneventful; it was about 3.30 when we arrived there, running straight on to the docks; such a crowd—men, horses, guns, wagons, forage, and a hundred and one things that go to make up an army, all over the place. The guns and wagons took a long time to get on board as each one had to be slung on separately; the horses mostly walked on board up long ramps, but some were very troublesome and took a long time.



The medical officer, the veterinary officer, and the skipper. August, 1914.



A ten minutes' halt on the retreat from Mons. September 1, 1914.

The name of our ship was the *Welshman*. Horse standings were fitted up all over the place, and there was no accommodation on the wretched ship for officers or men. Crowds of medical people were on board, and it was extremely difficult to find a square yard of deck to sit on; the little bit of top deck, the only part available on the old 'bus, was crowded. I was looking forward to a most miserable cold and uncomfortable night, as we were not due to sail until 10 p.m., and not due to arrive until 7 next morning. Nobody had the slightest idea where we were going to, not even the captain of the ship.

Luck, however, came my way, for the Colonel came to me and said he had put me in charge of men and wagons on another boat. I went off to find the captain, hoping to find something more comfortable, but knowing it could not be worse. This old tub was blessed with the name of *Achlibster*. The captain was one of the right old sort and made me very welcome, giving me a nice cabin to myself, leading out of which was the mess room. He gave me tea and a fat cigar, after which I felt very much better. I thought it best to keep this to myself, but I couldn't help thinking how I had scored by the change—no cold, hard iron deck, no nasty cold breezes to disturb my slumber. Later on I found the doctor wandering about, so I told him to go and get permission to travel with me. This he did, and we had a right royal passage, thanks to the captain and a case of champagne put on board by the owners for the use of officers. (We "did in" six bottles.)

Our old bus left first (before the *Welshman*), at 8.30 p.m., when the captain had his sailing orders given him. It was very interesting passing through all the searchlights from the forts at Portsmouth. We had dinner soon after starting, having a bottle each, then to bed, with a last sleepy thought of the cold iron deck of the *Welshman*.

August 19, 1914.—Up at 7 a.m. We saw a number of our cruisers, but nothing else. It was quite a nice morning, very quiet. At 12.30 we dropped anchor off Boulogne, with the knowledge we should not land until 7 that evening owing to the tide. For lunch we had tripe and onions, but I could not get on at all with it—it was *nasty*; but I quite enjoyed the cake, a bottle of bubbly, and a fat cigar. At 2 o'clock I was back in bed fast asleep, but not undressed. At 4 o'clock the steward woke me

up, saying a staff officer was alongside in a pinnace wanting me, so I tumbled off the bed on to the deck to see the little pinnace yards and yards below; it looked more like miles when I found I had got to go down the pilot's ladder over the side of the old *Achlibster*, outside a bottle of pop and half asleep.

This daring feat achieved, we steamed off to Boulogne Harbour, and had to land by ascending another wretched ladder up the side of the pier. I found the *Welshman* was already in, had passed us in the night and saved the morning tide. All our fellows were waiting about the docks for the old *Achlibster* to come in, as a lot of their wagons were on board her.

I found one of the horses had broken its leg while coming off the ship; this I wanted to shoot there and then, but was not allowed to do so, as no money would be paid for it unless taken and slaughtered at the abattoir, so a float was sent for and the horse taken away, slaughtered and dressed, and used for human food, the sum of £5 being paid for the carcase.

I waited in the docks until 8 o'clock, when the *Achlibster* arrived. I went on board and had a parting bottle with the captain. It took us until 11.30 p.m. to unload her, and about midnight we marched off through the slippery streets of Boulogne to our camping ground about four miles out. It was pitch dark, and consequently our pace was deadily slow; no one knew the way, but we arrived about 2 o'clock without any mishaps. It was quite a business unharnessing and picketing the horses, as we only had two candle-lanterns between us. It must have been about 3 a.m. when we lay down on the hard old ground for the first time with nothing over us. I could not sleep, it was cold and terribly hard.

August 20, 1914.—Up at 5 o'clock. I found I had been lying on a horse-shoe; in fact, it had almost been my pillow, so I picked it up and am keeping it for luck. I went round all the horses in the morning (we had 722); nothing serious the matter. In the afternoon went into Boulogne and had something to eat at the Bristol; my Colonel and Adjutant were also there, taking the opportunity of the last good dinner for a while. I left with them at 9 o'clock in a dirty old four-wheeler. About halfway back to camp we passed a number of G.S. wagons with heavy draught horses of the A.S.C. Soon after passing we heard a fearful rattle behind us, but could see nothing. We knew at once that it could

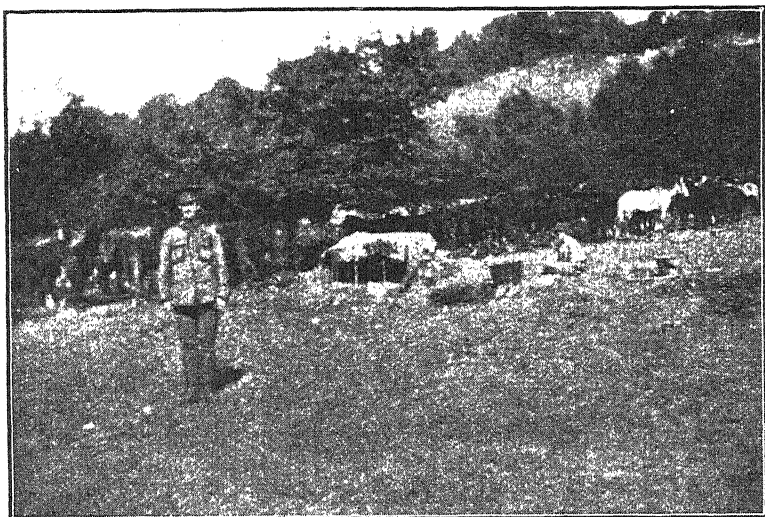
be nothing else than runaway horses, so pulling well into the left bank we jumped out; as we did so one of these pair-horse wagons passed us like a flash, missing our old cab by inches. This started another which happened to be just in front of us, the two of them going like blazes, and, of course, it happened on a steep down-hill bit of the road. One ended up by hitting a telegraph post, a horse going either side of it, smashing everything. The other ended up by going over a 12 ft. bank among thick bushes, trees, and wire; the horses naturally got hung up in the wire, as we had not wire cutters handy. I do not think from what I saw of the wagons by candle-light that they would be worth taking away; the horses got off lightly, but the drivers were knocked about a good bit.

Jack Johnson had a narrow escape that night of being knocked out. He came along the road in a little motor with his wife from the opposite direction certainly not more than two or three minutes after the wagons had stopped. As we got to camp we met our 1st Battery moving out to entrain.

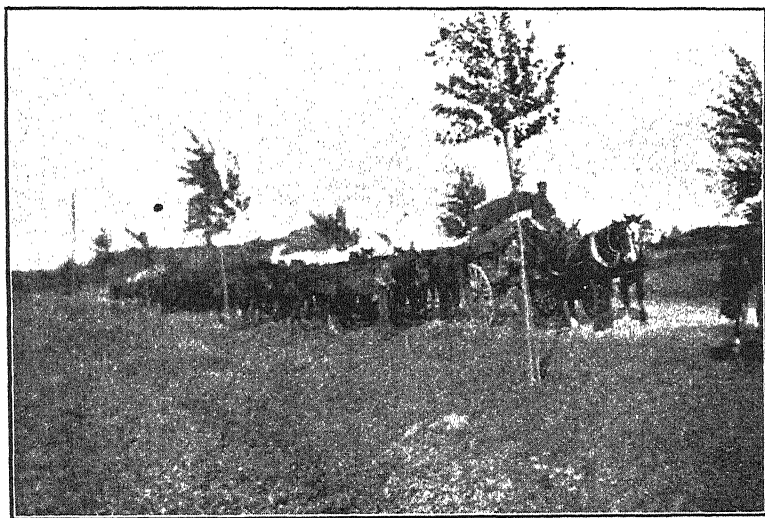
August 21, 1914.—Up at 5 o'clock, we struck camp and marched to Boulogne. At 8.30 we started entraining; this took till 11.30, as there was only one ramp for the horses. We then had a good breakfast, and left Boulogne just after 12. All along the line there was tremendous excitement, people giving the men all sorts of souvenirs at every little station we passed through. One of our fellows evidently liked the look of the French people, for he fell out of the train; we were not going very fast, so do not expect he was hurt much; we did not hear of him again.

It was 11 p.m. when we arrived at our journey's end at a place called —. Detraining, watering, feeding, and picketing took us till 2.30, when we lay down in the horse lines for a short sleep; the ground was awfully wet and it was raining, but we slept well until 4 o'clock.

August 22, 1914.—Up at 4 o'clock, marching out at 5 on a long, hot track through Landrecies to Leval, where we arrived after dark, about 9 p.m. We had some bully beef and chocolate during the day, but nothing to drink, so tea and bacon was great at 9.30 p.m. After this I went round all the horses, finishing about 11 o'clock tired out. I slept in a little farmhouse, but did not undress, as orders had come in that we might have to move at a moment's notice.



Horses under shelter on the Aisne. September, 1914.



A mobile veterinary section tracking back to the railroad with sick horses after the first advance. September 8, 1914.

August 23, 1914.—At 2 am. orders came to hook in and move off at once. That morning I shall never forget, it was most striking. I stayed behind in camp, until the three batteries had all moved out, to destroy a horse with a broken leg. It was quite dark as I rode out of the camp into the narrow country road with no sound save the rumble of the gun carriages and the clatter of the horses' hoofs going away in the distance; they went out at the trot. It must have been about 4 o'clock when we halted. It was just getting light, and away in front of us was the most wonderful deep red sky I have ever seen; it looked as though a tremendous battle was in progress and everything was on fire. I think as I sat there on my horse in the dim light, with the outline of men, horses, and guns around me, this wonderful red sky away some miles ahead over Mons, and the distant rumble of big guns, I realized for the first time we were on active service, and for the first time in my life I heard the words come down the line "Prepare for action."

We crossed the frontier near — and advanced some miles, when we had to reverse and retire to a small village, where we fed the horses; some 2,000 Infantry came by us here. I turned into a lovely orchard. My servant got me some water and I had a wash and a shave; he also brought me a bucketful of beautiful pears. It was a glorious day, and I was really enjoying myself; but it did not last long—orders came up to hook in, all baggage and transport wagons were to go back, and we trotted out three miles into action. It was really rather amusing, the things that dropped off the men and ammunition wagons; there were mess-tins, water-bottles, whips, tins of biscuits (25 lb.), bags of oats, trusses of hay; but there was no stopping. Our big guns (60 pounders) were firing over us as we went and the German shells were bursting along a line of trees marking a road on our front.

We came into action in a cornfield; the corn had been cut and was standing in cocks. We blazed away from here till about 5.30 p.m., no one being touched. The noise was great. I made myself very comfortable in the corn with the doctor, and we both enjoyed a raw turnip and a cigarette. Moving forward from here we next came into action on the other side of Harveng with two batteries, while the third battery went off with the Infantry Brigade and came into action at Givry, and had rather a rotten



German prisoners captured on the Marne. September 10, 1914.

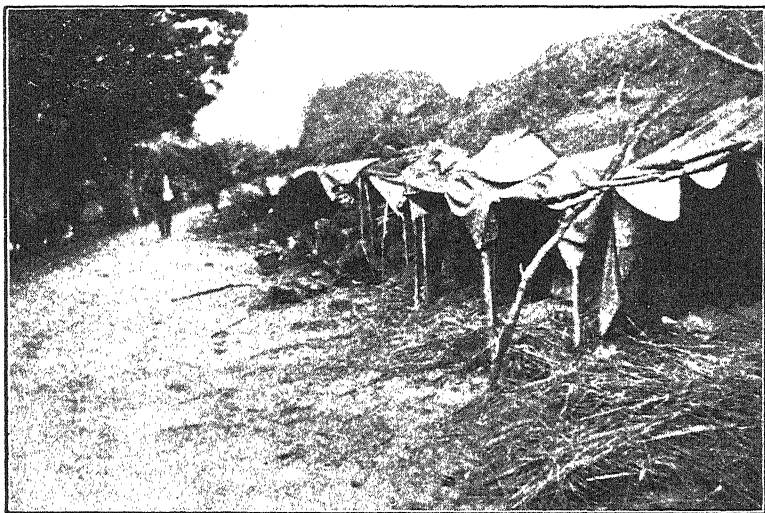


Result of an 8½-inch "Jack Johnson" in the waggon line. September 13, 1914.

time. We went on firing until dark, and a fair number of wounded men were brought into the Harveng Hospital.

It was about 9.30 when we brought the guns down through Harveng and bivouacked in a field close to the village. The ammunition column stayed in the village square, all the horses standing harnessed in the wagons, men were lying about all over the place, in roads, on wagons, some practically under the horses, tired out. I had just finished my walk round the horses, just to see they were as comfortable as possible, it was just after 11 o'clock, and I was wondering whether I should lie down, when an orderly came running down to me (he saw my lantern), saying the Brigade-Major wanted an officer at once at his office. On my arrival I found a very worried-looking little man, with two telephone operators at the table, writing down messages. The office was the back parlour of a dirty little deserted café. He told me to go at once and order the brigade to the cross roads, about two miles walk, as quickly as possible. He told me all our Infantry had been withdrawn from the front. I went down first to the Major with the ammunition column and told him. He was rather amusing; he said he was too tired to budge, but when I told him there was no Infantry between his little crowd and the Germans he woke up and got a move on. I then got on to the batteries, and we arrived at the cross roads at 12.15, where we stopped until 3 a.m.; the baggage wagons had been sent away, so we had no food and no blankets, and it was a cold night too. All the horses stood in the guns, the men lying in the road with them.

August 24, 1914.—Moving off in the dark we continued marching back and came into action at 6 o'clock, the Germans being close on our heels; we were doing rear-guard, shells bursting incessantly all that day; but none quite reached us, they were falling short. An aeroplane going over the German position had a very rough time. I counted thirty-five shrapnel in the air round about him at the same time; he never altered his course, but went straight on as though nothing was happening below. We managed somehow to keep them off, and continued our retirement through the afternoon. About 7 p.m. we turned into a field of standing wheat, lighted a small fire and made some bully stew, which we ate out of cups with forks—rather a difficult task, but it was thoroughly enjoyed. Lying down among the standing



Our dug-outs on the Aisne. September 13-20, 1914.



ON THE AISNE.

Eighty men of the King's Royal Rifles went into this barn. Seventeen killed, forty wounded, by one "Jack Johnson." September 15, 1914.

corn we were soon asleep, having been on the move for sixty hours out of the past seventy-two.

August 25, 1914.—Leaving again before light we made our way through a large, thickly wooded estate. It was just getting light when we came to the end of it, and found two large iron gates locked in front of us. There was no other way out, so the gates had to be broken down. This was no easy matter, but by the aid of a crowbar and drag ropes the gate gave out in about twenty minutes. There was no fighting that morning, we simply marched on and on, or rather back and back, until 4 o'clock in the afternoon. When arriving at the village of Landrecies we turned into a nice meadow for a rest and food. The baggage wagons met us here. The horses were unhooked, though not unharnessed; cooking pots got out; fires alight; we quite thought a few hours' rest were in store, but it was not to be. Up came a report before we had been there an hour that German Cavalry were in the village not 300 yards away.

Talk about "family coach," I shall never forget that evening; it started to scream with rain, just to make things more homelike. A brigade of guns in a meadow surrounded by a high hedge cannot do much, and we had no Infantry with us. The only thing to do was to clear out as quickly as possible; we just hooked in the horses and out we went, trotting up a narrow lane to the left, leaving in the field sides of beef, corn, nosebags, boxes of horse-shoes, nails, &c. Some of the stuff had been hastily thrown on to the wagons as we left, but this mostly fell off in the lane as we trotted on in the pouring rain. One could see nothing, as there were high hedges each side of us, and I do not think anyone knew where we were going, and so we went for about a couple of miles, the heavy horses in the baggage wagons trotting like hackneys. Suddenly an order came through that we were going the wrong way. Oh, what a mix up in that little country lane! The guns had to be reversed, which took some time; then back we came, even faster than we went, fully expecting every moment to hear the rattle of the German rifles. On arriving back at the village we were ordered into another field. At the time we were annoyed at not being allowed into the one we had left an hour before and where a lot of our stuff was lying; but, as it turned out later in the evening, it was a very good thing for us that we were not allowed to. We unhooked the

horses again, and had to be content with cold bully, no fires being allowed, not even lanterns. It was soon quite dark, but luckily the rain had stopped, though most of us were more or less wet through. There was nothing to do but just sit on the wet ground and wait for something to happen. We all knew something must happen before long, as the Germans were close on us.

It was just on 10 o'clock, everything had been very quiet up till then, that the first shell came over us. It was shrapnel, the bullets whistling through the trees, taking off twigs and leaves, over our heads. They kept up this shelling until 11 o'clock. They were really shelling the field we had been in first; this must have been given to them by a spy when we were there earlier in the evening. They had the range of this field well; the sides of beef, bags of oats, &c., must have had a rotten time, and so should we have had but for the lucky move; as it was we only lost two men killed and three horses hit. By this time the — Brigade had arrived, had barricaded the streets and a small bridge at the end of the village, and from here they were sending volleys into the Germans. The noise was terrific; between the volleys and the rattle of the Maxims one could hear the Germans cheering as they charged and threw themselves against our infantry. A gun was brought up against our fellows; every round—they were firing shrapnel—picked off someone. We had no guns in action. The German gun had got the range of our barricade and it was pouring round after round into us, each burst accounting for anything up to a dozen men. The position was very serious, and a message was sent to our Colonel to send down a gun at once. Lieutenant — was put in charge of it; he took up his position just behind the barricade. It was quite dark; he waited for the flash of the German gun and laid his own gun on that. At the third round, with a lyddite shell, he got a direct hit; up went the gun and also the cheers of our men. It was good shooting, and made a lot of difference to that night's work. Every window in the village was broken, the whole place was like a slaughter-house, over 800 Germans were lying dead and a number of our fellows too. It was a deadly fierce attack this; from 10 p.m. till 1 a.m. the fighting was desperate and the noise deafening, but we kept them off; we all realized afterwards what a near thing it was, more so than at the time.

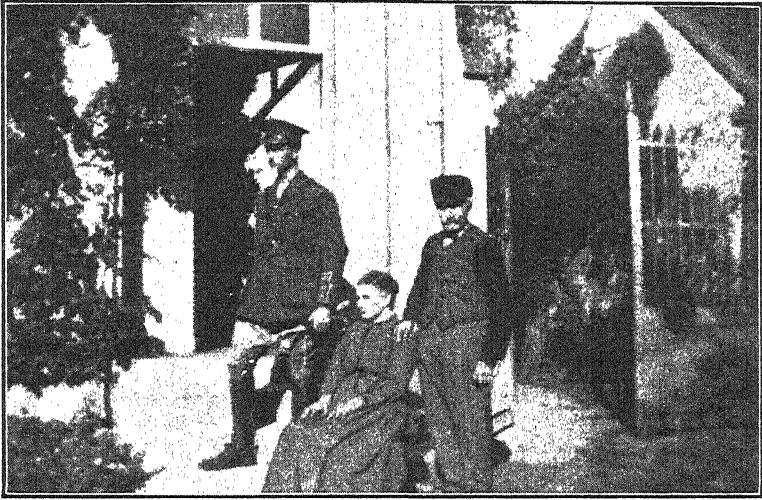
August 26, 1914.—At 3 a.m. we left the village and brought the gun into action just outside, to cover the retirement of the Infantry. By the greatest of luck the Germans did not press on that morning, they had taken a good knock, and so we got out of the tightest corner we had been in up to date. We had to leave behind many wounded, and some of our doctors stayed with them, all of whom were taken prisoners.

At midday we arrived at Etreu. The guns were dug in right across a big field at the entrance to the town, and here we waited for the German advance, which did not come. The only excitement during the afternoon was the dropping of a bomb from an aeroplane on our position; it did no damage. About half an hour afterwards it came back flying much lower. We had not fired at him the first time over, so he got more daring; this cost two flying men their lives, as we brought them down by rifle fire.

At 6 o'clock it started to rain. It was a night! The rain simply fell down and we did not have a morsel to eat; we lay down near the guns as soon as it was dark and tried to sleep—rotten.

August 27, 1914.—Up just after 4 o'clock, absolutely wet through. We started on our march towards Guise. I walked all the morning and got gradually dry; it was a beautiful day. In the afternoon we arrived at Riremont and bivouacked. After tea a report came up that the Germans were advancing on us from St. Quentin. We thought it was going to be another Landrecies, and we sent two batteries out into action; but it was a fairly peaceful night; most of us slept in a field of beet-root.

August 28, 1914.—Off at daybreak. We passed a squadron of the Scots Greys, who looked very businesslike. We tracked the whole of that day; seemed to have shaken off our pursuers for a little while. It was fearfully hot; we were all glad of a rest at Servais, a very pretty little village. We here took over two ammunition carts of the Essex Regiment, who had been cut up. The subaltern who brought them in told me that he, the Quartermaster, and a few men were all that could be found of the regiment. They got cut up on leaving their bivouac in the early morning. They walked into an ambushade and were annihilated with machine-gun and rifle fire. This rest was much appreciated, especially by the Infantry, who were dead beat. They had been marching by day and half the night since August 22.



[My host and hostess whilst convalescent with rheumatism. October 10, 1914.



My dug-out at Ypres. October 13–November 13, 1914.

In the afternoon four of the Scots Greys came into our camp. They and the 12th Lancers had just had a charge through some Germans; the horses' chests and the girths were spattered with blood.

August 29, 1914.—Stayed on at Servais, thoroughly enjoying the rest.

August 30, 1914.—A long hot march towards Terney, but no fighting. Starting early in the morning we bivouacked at Le Banc de Pierre, arriving there just after 5 p.m. My servant walked two miles for a loaf of bread to the next village. Nothing exciting happened here. Chickens and rabbits from a farm near by were much appreciated by the men; we had to pay 50 fr. afterwards for the wretched things.

August 31, 1914.—Marching out at 2.30 a.m., we tracked all day to Laversine through Pommiers, getting in about 5 o'clock; having been on the move since 2.30 a.m., we all appreciated a good wash in a ditch running by our bivouac. It had been a very hot day. We had managed to pick up a few bottles of wine on our way here; this was so hot we had to put the bottles into the washing ditch to cool. We had a most peaceful evening.

September 1, 1914.—Marched out at 3 a.m. through the beautiful forest of Villers-Cotterets. The Germans had caught up and were close behind us again. We were fighting rear-guard actions all day, the — Brigade again having a rotten time. On reaching the village of Cuvergnon we came into action. Guns were all dug in. It was a bad afternoon, lots of firing going on over the forest we had just passed through. A little farm at the entrance of the village was barricaded by the Engineers. Here we sat tight and waited until 2 a.m., expecting any minute an attack on the village.

September 2, 1914.—We marched out at 2 a.m., having been up all night, on a long march to Meaux. We bivouacked in a suburb of the town. A good-size canal ran along the top of our camp; I never saw more men bathing at once before, although we did not arrive in until late in the afternoon and had been marching since 2 a.m. It was the first opportunity of a bath, and although tired out the chance was too good to be missed. A number of French troops passed us here; these were the first French I had seen at all.

September 3, 1914.—We slept on until 4.30, my bed was most

comfortable in a potato field, and we marched out at 6 o'clock, passing again through Meaux, quite a number of horses falling on the slippery sets. The horses were showing signs of their long hours and long marches. Outside Meaux we passed over a large, well-built bridge, which was excavated and prepared for blowing up as soon as we were over. The bridge was over a river, and a large number of boats, small yachts, rowing boats, and two houseboats were alongside the bank. These were all towed out into mid-stream and sunk. They were sinking them by ripping out the bottoms with pickaxes. We bivouacked that night at Bilberteaux, beside a beautiful chateau.

September 4, 1914.—We had to retire from here in rather a hurry, the field we left being shelled very soon after we left it. We passed through some very fine orchards along the narrowest of lanes and kept going well into the night. At Mouroux we turned into a field of very long grass, it was nearly 3 ft. high, with a number of large trees; the place was pitch dark, no lights were allowed. Cold bully beef is wonderfully good fare when hungry coupled with a ration biscuit.

September 5, 1914.—Moving off before it was light we continued marching back; it was a fearfully hot day. We had a halt for two hours in the middle of the day; not a scrap of shade, the sun baked down on us. I got a go of fever and felt rotten. In the early evening we turned into a lovely old park. With 15 gr. of quinine I rolled up in three blankets and slept until 5 o'clock.

September 6, 1914.—At 5 o'clock we turned out. The Colonel had all the officers and N.C.O.'s together and explained the situation to us. He said we were going to advance, that we had finished retiring. Everyone was fearfully bucked up; we hooked in, and left this, our last bivouac of retirement, like a lot of dogs with two tails each and wagging both. We were utterly sick of this tracking back, back, back; but, of course, it had to be—but now it was over. With the exception of two nights at Servais we had been marching or in action for seventeen days and the greater part of most nights.

INSTRUCTIONS FOR A MOBILE VETERINARY SECTION.

(1) SITUATED within half a mile of the Division in order to be in direct touch with the Assistant-Director of Veterinary Services.

(2) *Collection of sick horses is as follows:—*

(a) The billet allotted to the Mobile Veterinary Section is published in Divisional Orders. Sick horses from units are sent if possible by men of the unit to the Mobile Veterinary Section, when they are taken over and a receipt given. If no men are available to send them a memorandum is forwarded to the Assistant-Director of Veterinary Services of the Division, informing him there are animals to collect at such and such a unit, and the men in the Section are sent to collect them.

(b) On the line of march *horses of units unable to proceed are left at farms* and other convenient places and note taken of the owner, name, address, and the date horses were left. This is forwarded to the Assistant-Director of Veterinary Services of the Division and he instructs the Mobile Veterinary Section of his Division to collect them. The collecting officer or non-commissioned officer gives the man who has been looking after the horses a note saying that the animals have been well cared for, or otherwise, and properly fed, and the man is paid so much per day (a special fixed rate of 1 fr.).

(c) When a certain number of cases are collected at the Veterinary Section arrangements are made with the Railway Transport Officer at railhead for horse trucks and the animals and cases are railed to the base. For each truck one man must be sent and one non-commissioned officer in charge of the party (*i.e.*, one truck: one N.C.O., one man; two trucks: one N.C.O., two men). Eight horses go to a truck, tied up, four on each side, faces inwards. Arrangements must be made by the Section for feeding and watering.

(d) *The Officer Commanding Base Hospital must be wired-dispatch of all sick horses.*

(e) All minor cases, those likely to become fit in ten days to a fortnight, are treated in the Section.

(f) *The Section is also an issuing medicine dépôt for the Division.*

(g) The men of the Section returning from the base bring back with them all medicines required by units of the Division, which are issued from the Base Veterinary Stores on indent signed by the A.D.V.S. The medicines are then issued to units by the Officer Commanding Mobile Veterinary Section on indents by the veterinary officers of the units.

(3) A Mobile Veterinary Section consists of one officer and twenty-six other ranks, but usually the strength in attached and others musters about thirty-three all told.

(4) Local labour can be obtained for the burying of horses. *A Mobile Veterinary Section is a self-contained unit*, running its own pay, clothing and forage accounts, and its own transport and section horses.

[Official Copy. Issued with Army Orders, dated April 1, 1915.]

FIELD SERVICE REGULATIONS, PART II.

(Reprint, 1914.)

40/WAR OFFICE/2412.

AMENDMENT.

40/WAR OFFICE/2403.

Chapter X, Section 79. *For paragraph 4 substitute—*

"4. Except in the circumstances mentioned in Section 26, paragraph 10, indents for animals to replace casualties in field units will be sent by commanders of units to the headquarters of the division or detached formation to which the unit belongs, and the division will send a consolidated indent to army, or cavalry corps headquarters. The remount officer attached to these headquarters will report these demands to the Inspector-General of Communications."

40/WAR OFFICE/2412.

For Section 80 substitute—

80. General Functions of the Veterinary Service.

(1) The veterinary service is organized with a view of securing the efficiency of the animals of the forces in the field:—

- (i) By preventing the introduction and spread of contagious disease.

- (ii) By reducing wastage amongst animals by means of prompt application of first aid.
- (iii) By relieving the field army of the care of sick and inefficient animals, the presence of which hampers mobility.
- (iv) By the treatment in hospitals of animals removed from the field army.
- (v) By the replenishing of veterinary equipment.

80 (a). *General Organization.*

(1) To carry out the duties specified in the foregoing paragraph the chain of veterinary organization is as follows: (1) Veterinary officers with field units; (2) mobile veterinary sections; (3) veterinary hospitals; (4) veterinary convalescent depôts; (5) depôts of veterinary stores. The whole being controlled by a Director of Veterinary Services, assisted by Deputy Directors and Assistant Directors.

80 (b). *Veterinary Establishments with Units.*

(1) To every cavalry regiment, artillery brigade, infantry brigade, divisional ammunition column, and divisional train, a veterinary officer is attached, and is assisted by the farriery establishment of the unit concerned. To these officers is confided the veterinary supervision and care of animals, and it is their duty to bring to the notice of the commanders any measures necessary for the health and condition of the animals under their professional care.

(2) Each unit is provided with a proper complement of veterinary equipment.

(3) Veterinary arrangements for units unprovided with a veterinary officer are made by assistant directors of veterinary services of formations concerned.

80 (c). *Mobile Veterinary Sections.*

(1) A mobile veterinary section is allotted to each division and cavalry brigade, acting under the orders of the commander of the formation to which it belongs.

Their function is to clear from the fighting zone all sick and ineffective animals, the presence of which hampers mobility.

(2) When troops are stationary, mobile veterinary sections may be utilized for the treatment of a limited number of cases.

80 (d). *Veterinary Hospitals.*

(1) Veterinary hospitals organized for the treatment of the more serious and prolonged cases, and capable of dealing with at least

1,000 horses each, are situated at the base, advanced base, and other points on lines of communication, convenient for rail and supplies. The first or advanced hospital on the lines of communication acts as the receiving hospital from which animals are drafted to other hospitals under the orders of the Director of Veterinary Services.

(2) An advanced depôt of veterinary stores is attached to this hospital for the replenishment of veterinary equipment of units in the field army.

80 (e). *Veterinary Convalescent Depôts.*

(1) One or more veterinary convalescent depôts are established on the lines of communication, to which horses requiring rest or feeding-up, after treatment, are sent.

80 (f). *Depôts of Veterinary Stores.*

(1) Veterinary supplies of all kinds are received at the base depôt of veterinary stores, and issued from there direct to hospitals, lines of communication, and to the advanced depôt of veterinary stores, for issue to units in the field army.

80 (g). *General System of Dealing with Casualties.*

(1) The principle aimed at is to maintain units up to their fighting strength in fit horses as far as possible.

(2) Minor casualties, or those which in the opinion of veterinary officers in charge of units are amenable to speedy recovery, will be retained for treatment under regimental arrangements. The more serious cases, each bearing a label indicating the disease and the unit, will be evacuated by the mobile veterinary section of the formation to the railhead, and thence by a conducting party from the section, to the advanced or receiving veterinary hospital.

At this hospital animals will be sorted and dispatched for treatment, as required, to the other hospitals on the lines of communication.

(3) All animals, as soon as they are fit for duty, will be transferred from the veterinary hospitals and veterinary convalescent depôts to the nearest remount depôt.

(4) Animals on the strength of the veterinary hospitals which are not likely to become serviceable again will be disposed of under the orders of the I.G.C., or destroyed.

80 (h). *Contagious Disease.*

(1) Any suspected cases of infectious or contagious diseases among animals that may occur in the theatre of operations will be at once reported, by telegraph if possible, to the nearest veterinary officer. The destruction of such animals will be carried out forthwith if its necessity is certified by a veterinary officer.

(2) All animals, including captured stock and slaughter cattle, before being utilized by the troops, will be examined by a veterinary officer as to freedom from contagious disease.

A similar examination will be held before any animal is removed from the theatre of operations.

80 (i). *Voluntary Aid.*

(1) All voluntary offers of veterinary assistance must be approved by the Army Council, and if accepted, will be controlled by the Director of Veterinary Services of the Force in the Field.

BEEF INSPECTION.

THE *Annali di Medicina Navale e Coloniale* has published a supplement on beef inspection, by Surgeon-Captain Dr. N. Ercole, of the Italian Navy. The author takes a wide view of his subject, dealing with the inspection of live cattle, of carcases, and of preserved meats. He discusses the tricks of the trade apt to mislead an examiner, and his statements concerning the daily length of march possible to a fat steer and the loss of weight of overdriven cattle will be very informing to naval officers concerned with such questions. As to tubercle, any portion of a carcase is condemned whose lymphatic glands, even one of them, is tuberculous, and that portion is denatured and destroyed; if, however, the lesion is single and of small extent, the rest of the carcase is allowed to be sold, but must first be boiled for at least an hour. The author notes that the ilio-lumbar glands, if tuberculous, and only then, give off sulphuretted hydrogen when treated with sulphuric acid.—*Lancet*.

Translation.

SODA POISONING IN THE HORSE AND COW.

BY DR. A. SALVISBERG.

Tavannes.

THE literature of soda poisoning in the large domestic animals is scarce. The second edition of Fröhner's "Toxicology" contains an account by Eggeling of soda poisoning in eleven cows which died showing symptoms of enteritis, and Wöhner, in the *Munich Veterinary News*, vol. lvi, p. 471, reports a case of soda poisoning. A cow which, instead of Glauber's salts, had received several pounds of soda in water during one day became ill with severe inflammation of the mouth, pharynx, stomach, and intestine, and had to be slaughtered. I have frequently seen soda given in error for Glauber's salts. The doses were but small, and were not given for a long period of time, so that no marked symptoms of poisoning occurred. If common soda like Glauber's salts is kept in paper bags or open vessels it gives up part of its water of crystallization, effloresces, and crumbles to a fine white powder. Sodium carbonate and sodium sulphate are liable to a similar change.

Two horses from the glass works in M—— stood at the goods station behind a waggon laden with sacks of soda. They eagerly ate pieces of soda from the torn-open sacks whilst the waggoner sat having his meal. On the same day both animals showed symptoms of colic and refused food. Therapy consisted in injections of morphia and hydrochloric acid in the drinking water. Next day I found the animals in a comatose condition, interrupted by sudden onsets of colicky pains exhibited in the usual way. No food was taken; only little acidulated water had been drunk; there was profuse diarrhoea with stinking straw-coloured dung; rectal temperature, 39° and 39·3° C. The plainly evident stomatitis was shown by salivation and swelling of the lips. Suddenly the horses began to put their mouths and tongues into the water and drank large quantities, the psychic disturbances disappeared, and the animals ate some oats and linseed. The colicky pains, were, however, still frequent, and many a time very violent. Therapy

consisted in daily administration of an opium ball, whereupon ease lasted for a few hours. This condition continued almost unchanged for eight days; then the colicky pains ceased, the dung was less stinking, firm, and of normal colour. For another full week the horses were off work, as they were apparently very weak. Doubtless through the soda a corrosive gastro-enteritis had occurred. The reason why the horses had voluntarily taken the soda was probably due to the one-sided plentiful oat diet that they had been having.

A young cow seven months in calf suffered from what the owner considered to be stoppage. His book recommended linseed slime, with Glauber's salts and olive oil, but a foolish handy-man advised soda as the best remedy. The housewife—not a temperance associate—prepared the nectar. The right quantity of soda was considered to be a handful. The dose weighed afterwards really amounted to from 800 to 900 grm. The cow got it in the morning. Late in the afternoon she aborted a living, hair-covered foetus. The after-birth did not come away. In the evening the animal commenced to groan and then to bellow, and she was slaughtered. Autopsy showed a diffuse, old peritonitis, with numerous adhesions and abscesses caused by a foreign body. With the exception of redness and swelling of the abomasum, the acute condition could not be easily differentiated from the chronic. It appears that the effect of the soda was to aggravate the chronic into an acute condition.—*Swiss Journal of Veterinary Medicine.*

G. M.

Reviews.

The Journal of the Board of Agriculture for April, 1915.—

Printed by James Truscott and Son, Ltd., Suffolk Lane, E.C.

Published by the Board of Agriculture and Fisheries, Whitehall Place, London, S.W. Price 4d. monthly.

This number keeps up the Journal's good reputation. It contains many timely and well-written articles instructive alike to the agriculturist and scientist.

Any new feeding-stuff that can be effectively used at present, at the same time being reasonable in price, is worthy of the consideration of rearers and feeders of stock. Mr. Charles Crowther, M.A., Ph.D., writes about "Dried Yeast as a Food for Farm Stock." He gives details of experiments conducted at the Manor Farm, Garforth (the Experimental Farm for Yorkshire), to gain experience of the qualities of dried yeast as a food-stuff. The principal conclusions come to are that dried yeast is a safe food for cows, pigs and calves; it has proved a good food for pigs, giving results markedly better than those obtained with an equal weight of wheat sharps. Dried yeast keeps well, and on mixing with other meals and water may be kept for some time without objectionable fermentation taking place.

Other useful articles are those on "Catch Crops and Home-grown Feeding-stuffs"; "Notes on Machinery and the Labour Supply"; "Technical Advice for Farmers" (a contribution showing what good work the Board is doing in furthering the interests of agricultural science, research, and education), "Danish Investigations showing how Tubercular Fowls infect Pigs." This paper indicates how the droppings of fowls suffering from tuberculosis may affect pigs, and it calls attention to the fact that the bacteria in the droppings of diseased fowls remain potent for a long period. We are glad to see this article, because in reviewing a recent leaflet of the Board on "Tuberculosis" we called attention to the omission of the mention of pigs being infected by diseased fowls. We note with pleasure that £40,000 is available for the purpose of improving the live stock of England and Wales. High-class bulls, stallions and

boars are to be provided, and the keeping of milk records is to be encouraged financially. The small holdings movement is advancing, and the extent of the unsatisfied demand for this class of homestead was less than at any time since the Act came into operation—a gratifying feature.

The Board may congratulate itself on the excellent educational work its "Journal" is doing, and on the monthly provision of very delectable reading matter.

G. M.

Canine Medicine and Surgery. By Chas. G. Saunders, V.S., B.V.Sc., Senior Professor, Ontario Veterinary College, &c. Published by the *American Journal of Veterinary Medicine*, Evanston, Ill., U.S.A. Price 2 dollars 25 cents.

This is one of the books at present being issued as a series of works on veterinary subjects, and edited by D. M. Campbell, D.V.S. Many volumes have been written on dog ailments, and if the surgery of their complaints has received up-to-date and comprehensive treatment, the same cannot be written about the medical region. It is a tall order to include both canine medicine and surgery, as known and practised in the present day, in one volume. The author, with some noticeable exceptions, has, however, produced a pretty complete résumé of the principal medical and surgical facts in connection with the dog. As regards paralysis, the articles are neither complete nor adequate, and the subject of canine vaccine therapy is entirely omitted. Some of the digestive diseases of the dog also might have been more fully dealt with, and others ought to have been included that are not there. Canine typhus receives no mention.

In those cases where treatment is given it is on modern lines, and the experience of the author enables him to supply some hints on therapy that are instructive and well worth reading. Part 1 of the work deals with the general diseases of the dog, and Part 2, limited to sixty-two pages, is taken up with a description of surgical operations.

There is nothing new in the book about the treatment of the various forms of mange. It is time a really up-to-date treatise was written on this subject and some extensive research conducted into the matter. We should like to know more about

the drug known as trypsogen jambul recommended for diabetes mellitis. If it produces good results there is a large field for its employment in canine practice here. We cannot find any mention of it either in the British or German pharmacopœias. The section on "Obstetrics" is timely and fills up a gap often noticeable in dog books. We like the lines: "The hands must be disinfected thoroughly, the instruments must be sterilized by *boiling* (laying them in antiseptic solution for a few minutes will not sterilize them), and the hind quarters of the patient must be washed repeatedly with an antiseptic solution." These words sum up the secret of successful operative interference in canine parturition, and no deviation from these instructions will be either modern or scientific. We agree with the author that early performance of Cæsarean section, where it is indicated, can alone produce the best results. We have seen some awful effects from prolonged fishing into the canine uterus with forceps, when Cæsarean section has been indicated almost from the first.

The little book is nicely bound and printed, and contains several useful illustrations. It is of a handy size, any subject can be referred to quickly by reason of the good index supplied, and it provides a useful every-day text-book for the veterinary practitioner and student.

G. M.

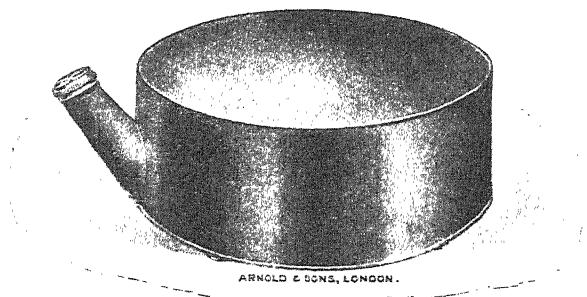
THE HUNTING MEMORIAL FUND.

THIS Fund closes on June 30, and immediately after the General Committee will meet to decide the way in which the money shall be disposed of. The amount subscribed up to the present is not great, and those who feel that the sum should be increased are invited to forward their contributions promptly to Mr. Henry Gray. Hunting did much to raise the status of the profession; he always championed the cause in its relation to the State, he was a leading spirit in the National Association, and an ever welcome member of the local societies. Many a veterinary surgeon has been willingly helped out of a difficulty by him. He was a man whom we ought to delight to honour. Have we done enough to perpetuate his name and to give him the place he is entitled to in the ranks of our distinguished men?

MANGE TRAY.

Below is an illustration of a mange tray, made for me by Messrs. Arnold and Sons. It consists of a circular water chamber with a concave upper part nicely japanned, which readily shows any object on its surface. With its aid one can easily and quickly examine a considerable amount of scurf from a suspected case of mange.

Method.—Fill the chamber with hot water and screw on the cap. The tray must not be too hot, otherwise the parasites are destroyed, but it should be as hot as one can bear the back of one's hand on it, then spread your skin scraping thickly over



its surface. If there are any live acari present, they will very soon be seen with a lens, running almost like the proverbial cat on hot bricks.

I have no pecuniary interest, either directly or indirectly, in the sale of this tray, and the only request I made to Messrs. Arnold and Sons (to which they readily acceded) is that they pay 10 per cent. on the sale equally between our two benevolent societies.

D. PUGH, F.R.C.V.S.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.

THE VETERINARY JOURNAL

JULY, 1915.

Editorial.

ON VERSATILITY.

THE ability to turn with ease from one method of doing a thing to another, from one way of treating a case to a second or third, and from one therapeutical view-point and application to a fresh vantage ground, has its value. Many-sidedness may prevent a person becoming stuck fast and overcome by a difficulty. A troublesome problem of cure may be solved satisfactorily by a man capable of various knowledgeable assiduity, whereas he of one idea will become hopelessly gravelled and unsuccessful by reason of his narrow outlook and scant armoury. The young man who sees practice under two or three tutors will have a better idea of different methods of accomplishing an end than he who spends his time sitting at the feet of one Gamaliel. To be really skilled in medical and surgical many-sidedness one must have a gymnastic mind, a dextrous hand, have moved about a little, seen things, assimilated the good and discarded the bad.

We are sorry to state that professional etiquette among us is not what it ought to be, and the ideal consultant is none too prevalent in our profession. Not a few men shiver when consulting has to be done. Versatility in the treatment of disease tends to lessen the necessity for consultations. But this varied application of knowledge must be wise, judicious, reasoned, and not of the mountebank or charlatan type. A noted doctor, who had been in practice many years, attributed much of his success in the treatment of a long series of cases to his strict adherence to the use of *one* drug. We have heard of a consultant who relied solely on the production of his effects, chiefly on the client, by ascertaining the medication that had already been used on a case and then suggesting some out-of-the-way agent difficult to

find in the Pharmacopœia and which the attending practitioner had possibly never heard of. This was always his plan of action. The veterinary surgeon who will probably achieve the best results in everyday practice will be he who adopts a steady mean between the way of the noted doctor and that of the wily consultant. The former might have achieved his results quicker if he had been more versatile, and the latter could hardly have had sufficient experience of all the rare things he advocated, although there is not much doubt he had studied human nature well in certain circles. To be really skilled in the use of therapeutic remedies externally and internally a man must read extensively, have some acquaintance with the records of foreign literature as well as that of his own land, and have practised over a wide field. Ability to turn from one curative agent to another never has its value more declared than in the treatment of such diseases as mange, canker, grease, &c.

In these days, in order to advance and earn one's bread and butter, it is almost essential to have experience of horse, cattle, and dog practice, and even sheep and pigs need consideration. The day of the horse field of practice only seems to have gone for ever. At present the ideal practitioner is he who is at home with any class of stock. Recently the biblical edict that "the first shall be last, and the last first" has received much exemplification in our ranks. One reason for the reversal has been lack of versatility (due to there being at one time little reason for its exercise), and the other the advent of motorism. From a monetary point of view, and notwithstanding "the bridge that carries us over" aphorism, we can see an advantage, to the young man at any rate, not knowing where he will finally settle, in being able to castrate a colt either by clams, torsion, écraseur, or emasculator, and either with his subject standing or recumbent. In general surgical methods, provided we do not wilfully disregard the cardinal rules of procedure, there is room also for the exhibition of versatility.

In the real scientist many-sidedness of mind must ever be in evidence. We must not lose intellectual elasticity as we advance in years if we are to be truly progressive. "Walk with the boys as long as ever you can" is a good motto. A change of field of observation is useful in keeping the mind flexible and the hand supple. "There is nobody under 30 so dead but

his heart will stir a little at sight of a gipsies' camp. Youth will now and again find a brave word to say in dispraise of riches, and throw up a situation to go strolling with a knapsack."

"To hold the same views at 40 as we held at 20 is to have been stupefied for a score of years and take rank not as a prophet, but as an unteachable brat, well birched, and none the wiser. It is as if a ship's captain should sail to India from the Port of London, and having brought a chart of the Thames on deck at his first setting out, should obstinately use no other for the whole voyage."—G. M.

FRENCH DOGS OF WAR.

NOT much has been written about them, but dogs are doing their "little bit" as well as their masters, says the *Sunday Chronicle*. In the French Army there are more than five hundred trained dogs at the front, some of which have become famous, as "True," which has himself saved the lives of a hundred and fifty wounded. Their duties on the field range from seeking the wounded, discovering the hidden enemy, to carrying messages. The Germans were not long in finding out the menace of these seemingly innocent *toutous* which wandered about in front of the trenches, and now they shoot every dog at sight.

I had the privilege of visiting the other day the training quarters in the Place Felix-Faure, at Grenelle, where the French "dogs of war" are trained. Practically none but sheep-dogs are used for the purpose, I was told, but these come from various parts, from Flanders from Beauce, and some even from over the German frontier. It has been found that by their blood and ancestry they take quickly and kindly to the vagabond life of the trenches and of the woods, and seem to love the sudden alerts, the vigils under the stars, the trust put in them. At Grenelle the dogs are lodged in kennels in a sort of miniature prairie, which gives ample scope for training.

M. Farges, the trainer, told me that it took on an average two months to prepare a dog for active service. Some were suited for one kind of work, others for another. One fine animal, almost human in its intelligence, he told me had been brought one day by a mother in deep mourning whose only son had fallen at Ypres. All she said as she handed him over was: "I bring you the constant companion of my son. He will serve his country as faithfully as he did." And that is what they are being prepared to do, these dogs; and then they are sent to the front, wearing a uniform, bearing a number, submitting to discipline, like any human soldier among the lot. I saw them at their exercises, and they were wonderful; but when one has watched a collie on a Highland hill among his sheep one was not over astonished.

General Articles.

MEMORANDUM ON THE TREATMENT OF THE BACTERIAL INFECTIONS OF PROJECTILE WOUNDS.

BY COLONELS F. F. BURGHARD, SIR W. B. LEISHMAN, F.R.S.,
SIR B. MOYNIHAN, AND SIR A. E. WRIGHT, F.R.S.

Army Medical Service.

OBJECT OF THIS MEMORANDUM.

It is proposed in this Memorandum (*a*) to synopsise the experience obtained in connection with wounds in this War; (*b*) to supplement this by setting out the chief data which have been furnished by a bacteriological study of the wounds; and (*c*) to lay down certain broad principles of treatment for the guidance of those who have not seen the conditions in the present War, or who have seen only an early or a late phase in the history of the wounds.

The present Memorandum will be followed up, as soon as certain researches are completed, by Memoranda on the employment of antiseptics and vaccines respectively.

I.—CHARACTERS OF PROJECTILE WOUNDS AND BACTERIOLOGY OF THE INITIAL INFECTION.

The wounds made by projectiles are not in any respect comparable to clean-cut, swabbed out, aseptic operation wounds, or to any of the accident wounds seen in civil surgery.

Special Characters of Projectile Wounds.

Where the projectile has passed through the flesh there will, in the ordinary case, be a torn and ragged track with an irregular surface of heights and hollows produced by the hernia of muscle and the retraction of the severed fibres. Where the projectile has come against bone this will be generally splintered, and the track will lead down into widely ramifying crevices between comminuted fragments.

There will also in practically every artillery wound be included foreign matter: a projectile, or shreds of clothing, or fragments of bone, and with these lacerated muscular and connective tissues which will slough. In addition, the wound will be full of blood clot and effused lymph. And lastly, the projectile, when it has

traversed soiled clothes or a soiled skin surface, will have carried in microbes, and these will have been sown all along the track.

This deep sowing of microbes, taken together with the blockage of the wound by blood clot, and the not infrequent obliteration of a section of the track by hernia of muscle, will, in the case of any deep or perforating wound, make the effective sterilization of the wound by antiseptics impossible.

Enumeration of the More Important Microbes which are carried into the Wounds.

Of the microbes which are carried into the wound the most formidable are the anaerobes and facultative anaerobes. These are found in very large numbers in practically every case arriving at the base from the Front.

Three species of microbes here come into consideration. The *streptococcus*, the one microbe which is, one may say, invariably present, is primarily responsible for the suppuration which will supervene in the wound. The *tetanus bacillus*, or a bacillus which is morphologically indistinguishable from this, is present in the pus from a certain proportion of cases. And in practically all the wounds we have also the *Bacillus aerogenes capsulatus* of Welch (*B. perfringens*). This produces a characteristically offensive, thick, frothy, rusty brown, sometimes almost fæcal, discharge.

Probable Derivation of these Anaerobic Microbes.—All these microbes would seem to be of fæcal derivation. The *B. perfringens* in particular is an inhabitant of the alimentary tract, and it can (by implanting in boiling milk and anaerobic cultivation) be readily recovered from the fæces of men and animals, from earth soiled with fæces, and from the soiled uniform of the soldier.

Disorders produced by the Anaerobic Infection.

The anaerobic infections of the imprisoned discharges which are here in question, may, if unchecked, lead to graver consequences. The streptococcal infection may lead to an infection of the tissues in the form of erysipelas or deep cellulitis, and it may culminate in septicæmia. The tetanus infection will, if the microbe cultivates itself sufficiently freely, and elaborates enough toxin in the wound, give rise to tetanus. And the bacillus of

Welch, when it manages to invade the tissues, will generate gas producing a gas phlegmon, and also an obstructive gangrene in the affected limb (so-called *gaseous gangrene*).

II.—MEASURES FOR CHECKING THE ANAEROBIC INFECTION OF DISCHARGES AND PREVENTING THE DEVELOPMENT OF TETANUS, GAS PHLEGMON WITH GANGRENE, AND STREPTOCOCCAL INFECTION OF THE TISSUES.

The rational line of treatment for the prevention of the grave sequelæ which are here in question will be to check at the earliest possible moment the anaerobic infection of the discharges.

Opening Up, Cleaning, and Draining of Wounds.

The wound ought to be freely opened up. It ought then to be carefully cleansed with an antiseptic solution (*vide* Memorandum on Antiseptics—Therapeutic Employment); all foreign bodies, sloughs, and blood clot (as far as this is possible without risk of hæmorrhage) being carefully removed. Then a very wide drainage tube, which will admit air to the interior, ought to be inserted, and, especially in those cases where there is much laceration, steps ought to be taken to promote the outflow of lymph from the walls of the wound (*vide infra*, Section IV).

By such steps we may hope to put an end to the anaerobic infection, and to obtain, instead of foul-smelling, gas-impregnated, decomposing discharges, a more or less "laudable pus."

Precautionary Measures to be taken where the above Treatment cannot be carried out.

Where, owing to the exigencies of war conditions, it is for the moment impossible to carry out the required surgical measures, or where from the nature of the case the wound cannot be effectively drained, it will be specially important to abstain from doing anything which might still further favour the anaerobic infection.

(a) *Points to be attended to in the Interim Treatment of Wounds.*—Wounds should not be sewn up after operation. We can never be sure that the projectile has not carried in infection, and we cannot under war conditions and during transport count upon the patient being kept, as he should be, under continuous observation. Plugs, except where there is actual risk of hæmorrhage, should never be left behind in the wound. For they bank

back the discharges and establish anaerobic conditions. For the same reasons it will be necessary to see that the wound is not wrapped up air-tight; that discharges are not allowed to dry upon the bandages; and that the mouths of drainage tubes are not blocked by the pressure of the dressings.

(b) *Prophylactic Inoculation of Anti-tetanus Serum*.—Moreover, it will, pending the opening up and cleansing of the wound, be very desirable to take certain specific prophylactic measures. By an injection of anti-tetanic serum we may hope to neutralize any tetanic poison which may be absorbed from the wound.

(c) *Prophylactic Inoculation of Anti-gangrene and Antisepsis Vaccine*.—Further, by the injection of a prophylactic dose of a vaccine containing the bacillus of Welch and the streptococcus (issued as *Combined Antigangrene and Antisepsis Vaccine*), we may hope to stave off an invasion of the tissues by these micro-organisms (*vide* Memorandum on the Employment of Vaccines). It must, however, be clearly realized with regard to these measures that they are only temporizing methods, and ancillary to such cleansing and drainage of the wounds as may in a particular case have been for the moment practicable.

III.—TREATMENT OF STREPTOCOCCUS INFECTIONS OF THE TISSUES AND “GAS PHLEGMON.”

When, by an unchecked anaerobic infection of the discharges, the resistance of the tissues has been lowered, and these have been invaded by microbes, it will be necessary to take immediate steps to stem that invasion.

We have at disposal two different methods of procedure. (a) We may take steps to increase the antibacterial powers of the blood fluids. (b) We may lay open and effectively drain the tissues (*vide infra*, Section IV) and so bring back to these their normal resisting power. These methods will be applicable according to circumstances, separately or in combination.

Erysipelas.—A streptococcal infection which takes the form of erysipelas can practically be always promptly extinguished by an injection of streptococcus vaccine (*vide* Memorandum on Employment of Vaccines) without recourse to any surgical measures.

Cellulitis.—When a streptococcal infection takes the form of a diffuse cellulitis, vaccine therapy will rank only as an auxiliary measure, and the laying open of the infected tissues and the

establishment of effective lymph lavage by the method indicated in the next section will be the essential.

What applies to the case of streptococcal cellulitis applies *a fortiori* to all infections of the tissues by the *bacillus of Welch*. In every case these must be opened up and effective lymph lavage induced.

Gas Phlegmon.

In connection with the actual surgical measures we have two cases to consider:—

(a) *Gas Phlegmon affecting the Subcutaneous Tissue*.—Where the infection follows a superficial course, manifesting itself in dusky blotchings of the skin and gaseous emphysema in the subcutaneous tissue, it will suffice to open this up freely by incisions carried down to the plane of the muscle. (And it is here thrown out as a suggestion that a more efficient evacuation of the lymph would be obtained if the incisions were disposed transversely instead of axially to the limb.)

(b) *Gas Phlegmon affecting the Deeper Tissues*.—Where the deeper tissues are diffusely invaded, and where the limb, owing to the internal tension, has assumed a blanched wax-like appearance, incisions into the subcutaneous tissue would not relieve matters, for the underlying muscle would protrude into and block the wounds. In these eminently dangerous cases it will generally be necessary to amputate. But it may sometimes be possible to save the limb by the free opening up of the deeper tissues and the introduction of large drainage tubes. In amputating for diffuse infection of the deeper tissues, or, as the case may be, for a progressive infection of the subcutaneous tissue, it is advisable, inasmuch as it is in these cases essential to obtain an absolute maximum of drainage, to do the flapless amputation—that is, to cut across all the tissues at one and the same level, and to leave the wound completely open.

IV.—GENERAL CONSIDERATIONS IN CONNECTION WITH DRAINAGE, AND MEASURES FOR PROMOTING THE OUTFLOW OF LYMPH FROM AN INCISION OR THE INFILTRATED WALL OF A WOUND.

The primary object of all opening up of wounds, and infected tissues, in short of all drainage operations, is, of course, to provide issue for pus and infected discharges.

The Mere Provision of an Outlet does not Satisfy Requirements.

But the mere provision of an outlet is not enough; nor is it enough to see the outlet so disposed as to allow of gravity carrying off accumulated discharges.

Lymph Lavage must be Superadded.

What we are seeking to secure will not have been attained until such lymph as may have become poisonous to leucocytes and impotent upon bacteria has been extracted from the tissues; until that lymph has been replaced by a lymph which is favourable to phagocytic activity and inimical to microbes; and until this last is being "drawn" into the wound and is establishing in it conditions which are favourable to healing.

When anything less than this has been achieved by the use of the knife, and in particular in the case where, in despite of incisions, the infective process has advanced, our drainage operation will have failed in its object, and our failure will be attributable to a sealing up of the fenestræ in the tissues, and a stanching of the lymph outflow.

Hypertonic Solutions of Salt will promote the Outflow of Lymph from the Walls of a Wound.

The remedy for this is to apply to the wound a hypertonic solution of salt to promote the outflow of lymph.

For ordinary use the best application will be a 5 per cent. solution of common salt combined with $\frac{1}{2}$ per cent. citrate of soda to render the lymph incoagulable. Where citrate of soda, or a similar decalcifiant, is not available, a simple 5 per cent. solution of salt will serve. Sea-water, this being equivalent to a 2.5 per cent. solution of salt, may also be employed. In dealing with dry and infiltrated wound surfaces stronger solutions of salt (up to 10 per cent.) will be found to resolve the induration and to clean up the wound surfaces much more quickly than weaker solutions.

In the case of deep wounds the simplest procedure will be to pour in the hypertonic solution and then plug lightly with gauze. Superficial wounds may be dealt with by laying on gauze thoroughly soaked in the solution. The limb should then be wrapped in waterproof material to prevent the bed becoming

soaked with the very copious discharge; and an application of vaseline will prevent irritation of the skin and stinging on freshly cut skin surfaces.

When the "Drawing Agent" has cleaned up Wound it is to be Discontinued.

The "drawing agent" has done its work as soon as it has checked the spreading invasion of the tissues; or has cleaned up the dry and indurated wound surface, and this last has clothed itself in bright coral-red granulations. The hypertonic salt solution may then be replaced by some simple dressing (*vide* the final paragraph of this Memorandum).

V.—TREATMENT OF THE SUPPURATION WHICH WILL SUPERVENE UPON THE LAYING OPEN OF WOUNDS AND INFECTED TISSUES.

The laying open of the wound or the infected tissue effects, as consideration will show, only the conversion of a more, into a less, dangerous form of infection; and we are, after our operative procedures, faced with a suppurative infection of our open wound, and of our superadded incisions; and have now to check that infection.

It will in practically every case be an infection by the streptococcus combined with the staphylococcus. And in very many cases there will be a superadded infection by coliform organisms, in particular by the *B. proteus*.

The therapeutic methods which we have here at disposal are the following:—

(I) PROVISION OF SATISFACTORY DRAINAGE AND LYMPH LAVAGE.

The first and most important thing will be to provide in the dependent portion of the wound a free outlet for the discharges, and to secure, when we are dealing with infiltrated wound surfaces, a free outflow of lymph (*vide* Section IV).

If, by either of these methods, or by a combination of the two, we succeed in providing effective lymph lavage for our wound, we shall have very little difficulty with the infection.

But it will, in a very large proportion of cases, be quite impracticable to obtain all that would be desirable in the matter of drainage; and it is all-important to recognize, in connection

with these cases, that "conservative surgery," as applied to the wounded, means making, for the purpose of conserving a limb, legitimate sacrifices with respect to drainage. The question, and it is the most anxious and responsible question in all surgical procedures, as to how far one may sacrifice drainage, can only be arrived at by balancing in each particular case the advantage of preserving a limb against the risks of long-continued supuration and eventual septicæmia.

We require here to have clear conceptions as to what amount of help is obtainable, on the one hand from *vaccine therapy*, from the employment of *antiseptics* in the wound, and from *frequent dressings*.

(2) VACCINE THERAPY IN ITS APPLICATION TO SUPPURATING WOUNDS.

It is important in connection with this method of treatment to realize (*a*) that it aims at increasing the anti-bacterial powers of the blood, and (*b*) that the conditions which determine our success or failure are essentially the same when we employ vaccines as when we set ourselves to combat infections by the aid of the antibacterial power of the normal blood.

Ideally favourable conditions for the successful employment of a vaccine will be given when this is employed in treating a perfectly well-drained wound (let us say such a wound as that furnished by a flapless amputation); or, again, in treating an incursion of a microbe into a tissue where there is a very free lymph flow (let us say, such an infection as erysipelas). Here, by the use of an appropriate dose of the proper vaccine or vaccine mixture, successful results may be confidently expected.

The most unpromising cases for vaccine treatment are those where we are dealing with an unopened abscess sac, or a quite undrained wound, or an old-standing cicatrized tissue infection. Here the microbes are shut off from the blood fluids, and in these cases the utmost we have any right to expect is to prevent an extension of the infection and to ward off septicæmic complications.

In the case here specially in view, that of the imperfectly drained wound, we may expect to obtain by the repeated inoculation of the appropriate dose of the proper vaccine or vaccine

mixture, not anything in the nature of dramatic results, but a certain improvement in the local conditions, together with a certain protection against septicæmia.

We may, in short, expect from vaccine therapy results which will make it possible to employ conservative methods in a larger proportion of cases; to hold on longer to these methods; and to carry them oftener to a successful issue. It would therefore be advisable to carry out vaccine therapy as part of the routine treatment of suppurating wounds. (*Vide* Instructions issued with Antisepsis Vaccine.)

(3) EMPLOYMENT OF ANTISEPTICS IN WOUNDS.

Therapeutic Employment of Antiseptics has given Disappointing Results.

It is notorious that the results of the treatment of suppurating wounds by antiseptics are disappointing, and that the reasoning which led to the universal adoption of this therapeutic method was, in point of fact, too unsophisticated.

It was tacitly assumed of chemical agents which acted as antiseptics in watery solution that they would do so also in blood fluids and pus; and that they would also penetrate a certain distance into the tissues and into blood clots. We now know that antiseptics do in these respects very much less than was anticipated.

It was further tacitly assumed that an antiseptic which gave good results with one particular microbe or group of microbes ought to give good results indiscriminately with all. But it is possible that particular antiseptics may be appropriate to particular microbes and groups of microbes; that, for instance, such an antiseptic as peroxide of hydrogen, which has very little effect on ordinary pyogenic microbes, may be specially effective on anaerobic micro-organisms.

Importance of Selecting the Appropriate Antiseptic for each Class of Case.

But, at any rate, the principle has emerged that, in choosing our antiseptics and the strength in which these are to be used, we ought to guide ourselves by actual experiments on wounds and on the microbes which come into consideration in connection with those wounds. And it would be clearly inadmissible in

choosing antiseptics for employment in projectile wounds to leave out of sight the fact that anaerobic microbes and their spores have to be dealt with, and that the antiseptics we employ ought to be competent to kill these.

Discussion of Advantage expected from a Partial Sterilization.

Again, it is still tacitly assumed by practically every one who employs antiseptics that, even if treatment with an antiseptic effects only a partial sterilization, such partial sterilization will always be something to the good.

This amounts in point of fact to the assumption that by substituting a smaller for a larger sowing the number of microbes in a culture will always be sensibly reduced.

In reality this will depend upon two factors, (a) the nature of the culture medium, and (b) the shorter or longer period allowed for the cultivation.

When we are dealing with a culture medium which is ideally favourable to the multiplication of microbes, the smaller sowing will, after a short space of time, give exactly the same number of microbes as the larger.

When we have a culture medium in which microbes develop very slowly, the smaller sowing will for a very long time give a correspondingly smaller number of microbes.

When a cultivation medium which is unfavourable to microbes is after a certain lapse of time converted into a medium which is favourable to them, it will not be the larger or the smaller sowing, but the date at which the character of the fluid changes, which will govern the result.

Evolution of Events in an Infected Wound rhythmically after each Dressing.

We have now to apply these general principles to the case of the cultivation of microbes in wounds; and we may consider first the evolution of events in wounds treated without antiseptics, and then inquire in what respect the use of antiseptics could modify this evolution.

There will, after washing out, remain behind in every wound a certain quantum of pus. In one case it will be a question of minimal collections left in the shallow depressions of a granulating surface; in another a question of quite large collections held up in inaccessible pockets.

This residual pus will furnish the sowing of microbes, and a culture will be set going as soon as lymph begins to trickle into the wound.

But the new culture will start off very slowly, and for two reasons: *First*, because the lymph in the condition in which it exudes inhibits nearly all the microbial growth; *secondly*, because we have in the lymph phagocytically active leucocytes.

For a certain time these natural checks or microbial growths will be maintained. The conditions will, however, when the lymph is fouled by an appreciable mixture of residual pus, change rapidly. Phagocytosis will be arrested, and the effused lymph will be transformed into a medium which will be eminently favourable to the multiplication of all manner of microbes. If we now wait for only a few more hours we shall have in the wound a very luxuriant growth.

Coming now to the question how good could come of the employment of antiseptics in wounds, we recognize, in the first place, that we might by these means achieve an appreciably smaller sowing of microbes. *Further*, it is conceivable that, if we were to leave behind in the wound a sufficiency of antiseptic, we might obtain from it such a reinforcement of the growth-inhibiting power of the lymph as should more than offset the set-back inflicted by the antiseptic in paralysing the phagocytic action of the leucocytes. *Lastly*, it is possible that an antiseptic, left behind in the wound in sufficient quantity, might prevent the residual pus converting the lymph into a good nutrient medium.

*Smaller Sowing of Microbes probably not a Factor of
Dominating Importance.*

In reality these possibilities do not amount to much. It is clear that that appreciably smaller sowing of microbes which we are working for would be realized only where the whole wound surface can be thoroughly washed with an antiseptic. But these are precisely the cases where the effect of a smaller sowing of microbes would not make itself very much felt; for where the wound is left practically free of residual pus the natural checks of microbic growth would be longest maintained.

With regard to the other possibilities, all that is necessary to say is that they must rank only as possibilities, and that up

to the present experiment has not furnished anything in confirmation of the idea that the introduction of antiseptics into wounds would be likely to contribute to the arrest of suppuration.

Utility of Antiseptics in the Prevention of Outbreaks of Serious Septic Infection.

It must, however, be emphasized, in conclusion, that in the treatment of the wounded in hospital it is essential to look beyond the individual to the aggregate. And even if it were finally to emerge that the employment of antiseptics did not do anything towards the arrest of suppuration in an infected wound, the taking of careful antiseptic precautions, and the washing out of the wound by antiseptic solutions would none the less be indispensable. For if such precautions were omitted, infective microbes would inevitably be carried from one wound to another, and there would inevitably, by such "passaging," be bred out in hospital very virulent strains of microbes, which would, as in pre-Listerian days, induce all manner of fatal septic infection.

(4) FREQUENT AND EFFICIENT DRESSING OF THE WOUND.

Importance of Frequent Dressing of Wound.

Coming back from this general consideration to the question of the treatment of the individual infected wound, it will be clear from what has been said above that the frequent and efficient washing out and dressing of the wound will be a factor of dominating importance in the treatment of the infection. Where comparatively long intervals intervene between the dressings, where pus is left behind in the wound, where the discharges are confined by plugs or multiple folds of dressing, and where, in the case of a deep wound, too small drainage tubes are employed, little or no progress will be made. Where large drainage tubes are employed, where the wound is frequently washed out, where no pus is left behind, and where only a very light dressing is employed, we shall be making progress.

Continuous Immersion or Irrigation for Heavily Infected Wounds.

And clearly, so long as a wound is heavily infected, the ideal method of treatment, if only it were always practicable,

would be immersion in a bath or continuous irrigation with some aseptic, or mildly antiseptic fluid.

Exposure to Air and Drying Off of Wounds after Infection has been Brought under Control.

When the continuous bath or, as the case may be, lymph lavage induced by hypertonic salt solution, has brought the infection under control, what remains of that infection may very often be extinguished by freely exposing the open wound to the air. The part which the drying off of the wound surfaces and the concentration of the discharges plays in the killing off of the residual microbes has not yet been investigated.

(NOTE.—The recommendations with regard to surgery which are put forward in the memorandum have been formulated in consultation with Colonel Sir B. Moynihan and Colonel F. F. Burghard.)—*British Medical Journal*.

INJECTION OF OXYGEN AS A TREATMENT FOR TETANUS.

By H. O. HOWITT, M.D., L.R.C.P.LOND., M.R.C.S.ENG.,

AND

D. H. JONES.

Professor of Bacteriology, Ontario Agricultural College, Guelph, Canada.

As *Bacillus tetani* is an obligate anaerobe and will not develop in the presence of the smallest amount of oxygen, it was thought that the injection of oxygen into a tetanus wound, and into the tissue immediately surrounding the wound, would be more or less efficacious as a treatment, or auxiliary treatment, in delaying the onset of the disease or rendering it less acute, if not in preventing the development of the disease altogether.

In the *Canadian Medical Association Journal* for November, 1914, one of us (H. O. H.) reported beneficial results from the subcutaneous injection of oxygen in cases of dyspnoea of tuberculosis, gas poisoning, pneumonia, oedema of lungs, bronchial asthma, and operative cases, and the success with this treatment led to the surmise that it might be valuable in cases of tetanus and other anaerobic infections, such as malignant oedema, symptomatic anthrax, &c. The prevalence of tetanus infections, causing extreme mortality in the European War zone, made it

appear probable that a few animal inoculation experiments with tetanus and the subcutaneous injection of oxygen might be of use in ascertaining whether the treatment was of any value in this connection. Accordingly, Dr. G. C. Creelman, President of the Ontario Agricultural College, was asked if it would be possible to carry on the experiments with tetanus in the bacteriological laboratory of the College. Dr. Creelman readily gave his consent and referred the matter to one of us (D. H. J.) in charge of the laboratory. As a result, the following experiments were planned, in which we were respectively responsible for the oxygen injections and the cultures, inoculations, and subsequent observations.

Cultures Used.—A fresh culture of *B. tetani* was obtained from Parke, Davis and Co., and subcultures were made from this in dextrose beef-extract bouillon and dextrose beef-extract agar, incubated under anaerobic conditions at 37° C. for three days, and kept later at room temperature.

Virulence Tests.—To test the virulence of the cultures a guinea-pig, weighing 790 grm., was inoculated subcutaneously on the inner side of the right thigh with two drops of a three-day-old bouillon culture. After twenty-four hours tetanic symptoms were shown by the extension backwards and outwards in a rigid condition of the inoculated leg. Five hours later respiration was laboured, and the hinder half of the body was partially paralysed, being dragged around the cage with difficulty; twelve hours later—a total of forty-one hours from the time of inoculation—the animal was found dead.

Oxygen Injection Experiments.—The oxygen injected was obtained from some oxone cartridges as prepared by the Roessler and Hasslacher Chemical Co., New York, from which oxygen was generated in the portable oxygen generator made by the Hartz Company, of Toronto, Cleveland, and Detroit. The oxygen escapes by means of a long rubber tube, at the distal end of which is an aspirating needle which is inserted into the subcutaneous tissue. The tube is then oiled, and by a pumping action of the hand the oxygen is forced through the needle.

SERIES I.

In this series four guinea-pigs were used. They were divided into two pairs. All four were inoculated with *B. tetani*, and

one member of each pair was given an injection of oxygen near the point of inoculation, while the remaining member of each pair was kept as a control. Sufficient oxygen was given to raise an emphysema from 3 to 5 cm. in diameter in the immediate region of the point of inoculation. (*Note*.—In all the cases where tetanus developed the symptoms were similar to those described above in the virulence test, the only difference being the varying time of onset and termination of the disease.)

With the first pair of guinea-pigs where half a drop of culture was used for inoculation tetanus developed and terminated fatally in the case of the control, but had not developed where oxygen was injected eighteen days later. With the second pair, where the amount of inoculum was double that used with the first pair, tetanus developed with fatal termination in both cases, but the appearance of tetanic symptoms and subsequent death were considerably deferred by the one injection of oxygen.

SERIES II.

For this series the agar-plate cultures were used. To inoculate, a puncture was made through the skin with a sterile sharp instrument, then a platinum needle was drawn through the surface growth of the culture and inserted into the wound. As with Series I, four guinea-pigs were used. They were divided into pairs, and one of each pair was inoculated and immediately given a subcutaneous injection of oxygen, and the other member of each pair was inoculated and not given oxygen.

With the latter pair of guinea-pigs, as with the second pair in Series I, we noticed that while tetanus with fatal termination developed in both cases the time of onset of the disease and of death was much delayed by the oxygen injection.

We take it for granted that the reader is acquainted with the modern treatment of tetanus—*e.g.*, use of anti-tetanic serum, hypodermic injections of dilute carbolic acid solution, anæsthesia for spasms, the darkened room, chloretone, &c.—but draw attention to the fact that the only treatment used in these experimental cases was the direct deep injection of oxygen into the wounds, and we assume that if the beneficial effects in these cited cases were due to the injection of the oxygen other anaerobic infections might be at least equally well benefited.

We do not say that these limited experiments prove con-

clusively that subcutaneously injected oxygen is a sure cure for tetanus, but we think the results obtained warrant their publication, and we feel justified, in view of the fatalities that are occurring in the war zone from tetanus, to call the attention of the medical men in attendance, and others, to the beneficial effects obtained from this treatment as in the above cases, with the hope that it may in some measure aid in the prevention of, or recovery from, the disease with the wounded.

A fuller account of the experiments will be published later, and further experiments are planned which it is intended shall be carried out in the immediate future.—*Lancet*.

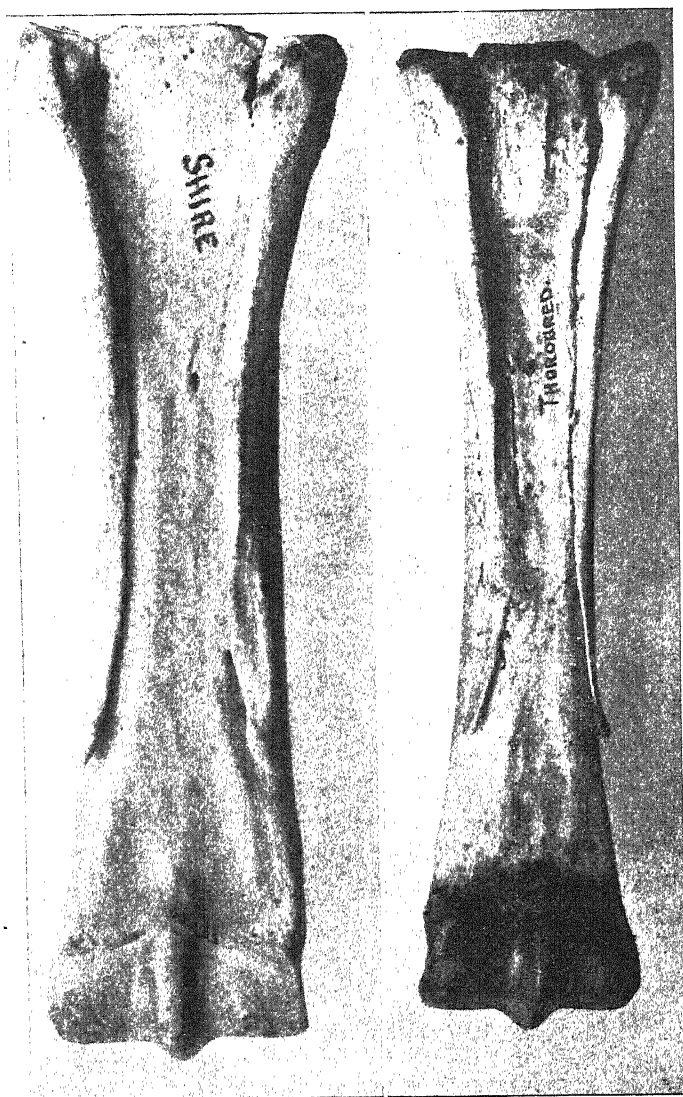
SHIRE BONE AND THOROUGHbred BONE.

A CONTRAST AND COMPARISON.

By HERBERT PRATT.

(Reproduced by special permission from *Country Life*.)

IN the course of the correspondence on the "Half-bred Sire" in *Country Life* a sentence occurred in a letter written by Mr. George Cradock which gave me to think, as the French say. It was that "the deer has the finest grained bone of any animal; next to that the Arab horse, and next to that the English thoroughbred. The cart-horse has a round, spongy bone. If a section could be taken of the bone of a good thoroughbred horse of the actual area of the solid bone, and compared with the cart-horse or partly bred cart-horse, it will be found that there would be greater strength in the thoroughbred, although it would measure less." Many statements of opinion leave one with a sense that you may either agree or differ from them; there is no means of bringing the author to book, of subjecting his theories to physical tests the result of which ends the argument. They are in their nature vague and cloudy, but my matter-of-fact mind seized upon this as belonging to a different category. If animals can be classified according to the fineness of grain and density of their bone, and placed in an order of merit, such as Mr. Cradock drew up—deer, Arab horse, English thoroughbred and Shire—one would think men of science must have done the necessary weighing and calculation ages ago for the benefit of

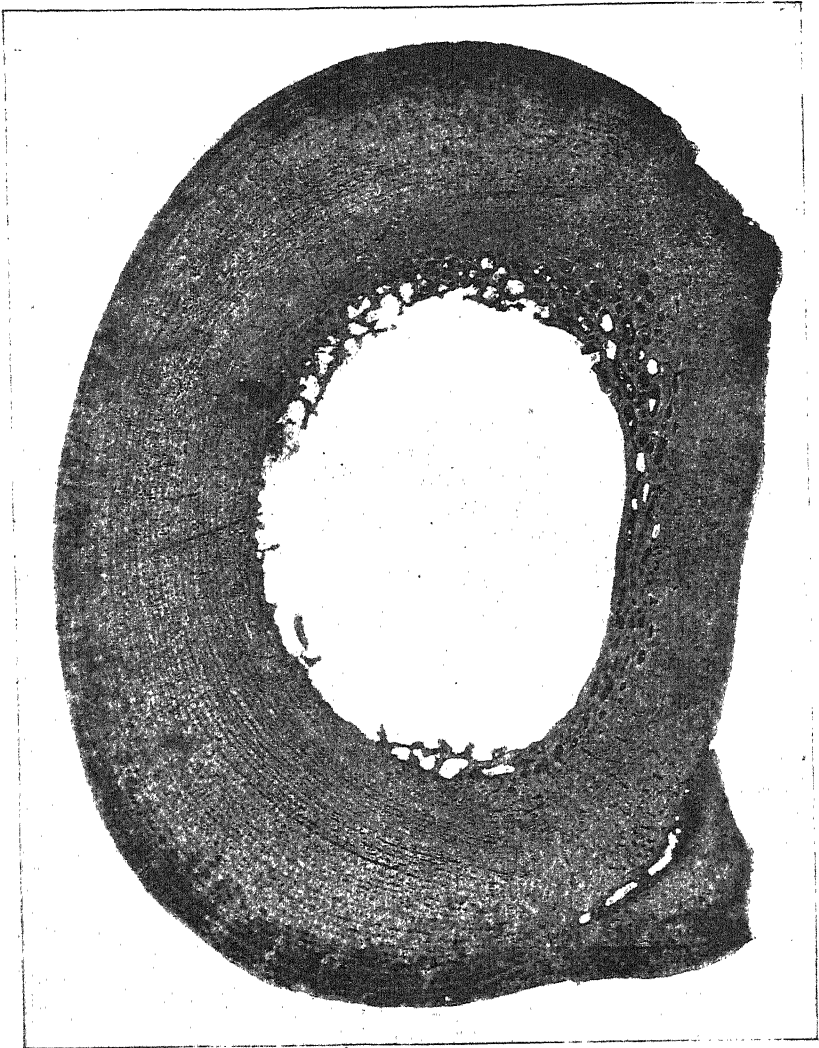
*Shire (back).**Thoroughbred (back).*



Shire (front).

Thoroughbred (front).

Cannon bones of Shire and Thoroughbred Horses. (*Half natural size.*)



Very thin section of the Shire's bone photographed by transmitted light, and enlarged to show grain.

the unlearned and merely practical men, like myself. Here it is obvious that a scientific examination ought to make further argument unnecessary, and settle once and for ever the differences between the "bone" of the thoroughbred and that of the cart-horse. In my innocence I thought all that was necessary

was to apply to one of the seats of veterinary learning and get authoritative confirmation or denial of the statement. But inquiry only laid bare the fact that I had hit upon a tiny, but important, corner of knowledge that had not been explored by our leaders in veterinary science. At the Veterinary College I asked in vain. No one had worked it out. At Cambridge University, Professor Marshall saw the importance of the investigation, but could not find time to undertake it.

Evidently, if my curiosity was to be satisfied, it would only be by starting a little research for the special benefit of readers of *Country Life*. What encouraged me to do this was the universal agreement that the knowledge gained would be of invaluable service to horse-breeding. Therefore, I began to stir up the authorities on the subject, and, luckily, was able to enlist

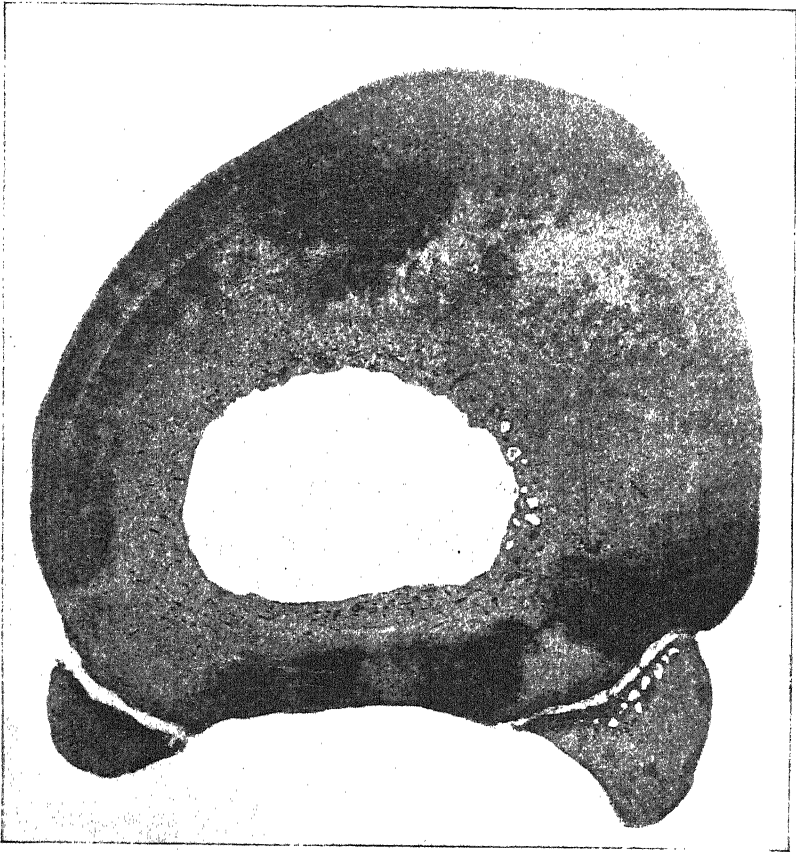


Shire.

Thoroughbred.

Section cut from centre of cannon bones. (Natural size.)

the active co-operation of Mr. E. H. Leach, the famous veterinary surgeon of Newmarket. He sent me the cannon bones of a thoroughbred horse and of a Shire horse. These were each photographed half their natural size from three points of view. They are reproduced with these notes, and show the comparative sizes. The Shire bone has not only greater length, but considerably more bulk—facts patent to the eye, but offering a solid start for further study. The next step was to send the bones to Messrs. Watson and Sons, and ask them to cut cross sections from the centre—a delicate and fine operation, as I need scarcely say. They succeeded admirably, and I had the sections photo-



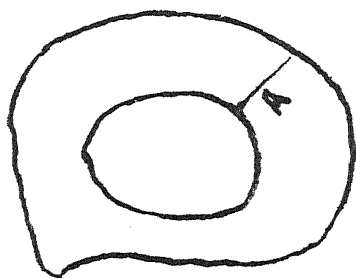
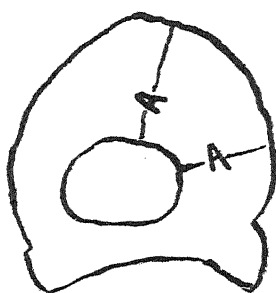
Very thin section of the thoroughbred's bone photographed by transmitted light, and enlarged in exactly the same proportion as the Shire's bone.

graphed exactly natural size, and that led to the solution of the riddle. From an accompanying illustration, where the two are shown side by side, it will be seen, firstly, that the diameter of the marrow cavity in the centre of the bone of the Shire is much greater than that of the thoroughbred. Then it will be noticed that (to the naked eye at least), though smaller in circumference, the latter appears to have quite as much actual bone as the former. If an exact calculation could be made it would add considerable value to these photographs.

And now a further step was possible. A very thin and transparent slice was cut from these two small sections—another

specimen of exact art. They were mounted on glass and microscopically enlarged by transmitted light. This was done in order to show the difference between the grain of the bone in the two breeds. These magnified photographs speak for themselves. They bring home the superiority of the bone of the blood horse in a manner admitting of no question or denial. The finer quality and actual amount of his bone explain his ability to carry weight which seems disproportionate to the apparent size of that bone. It should be mentioned that the dark patches on the enlarged photographs, particularly in the case of the thoroughbred, are merely natural colour differences due to the freshness of the bone.

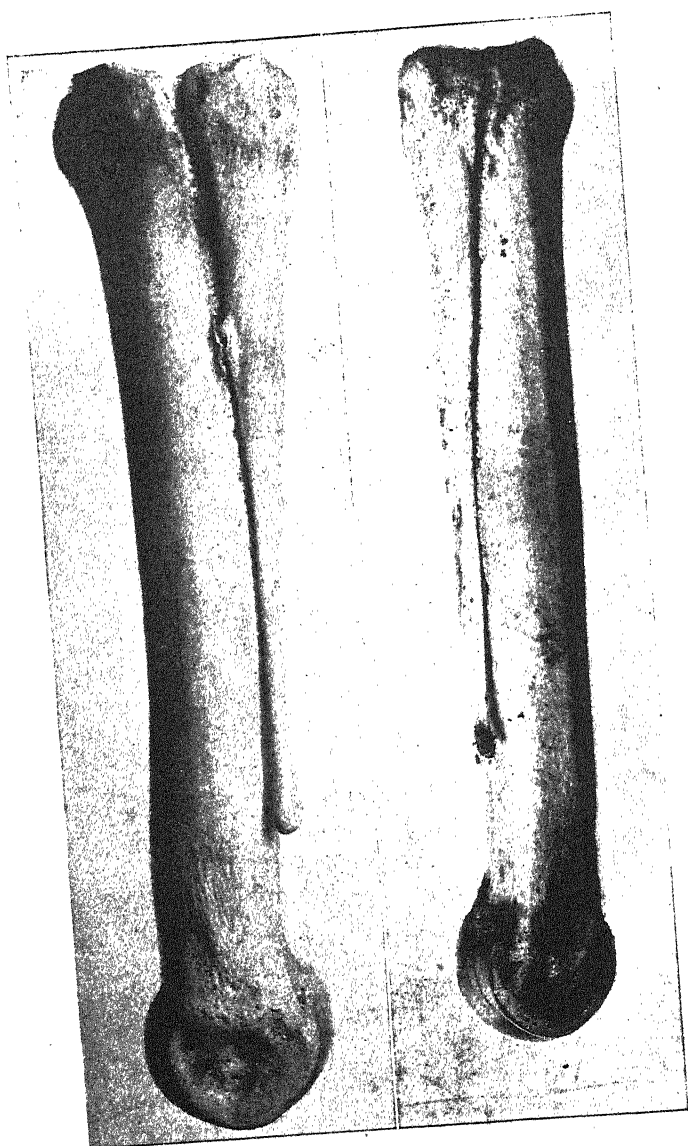
A friend, who is one of the greatest living authorities on the thoroughbred, points out to me the considerable difference in the manner of distribution of the bone in the two breeds. In the case of the Shire it is more or less regular. The shape of the thoroughbred's bone has far more width just where, in his

*Shire.**Thoroughbred.*

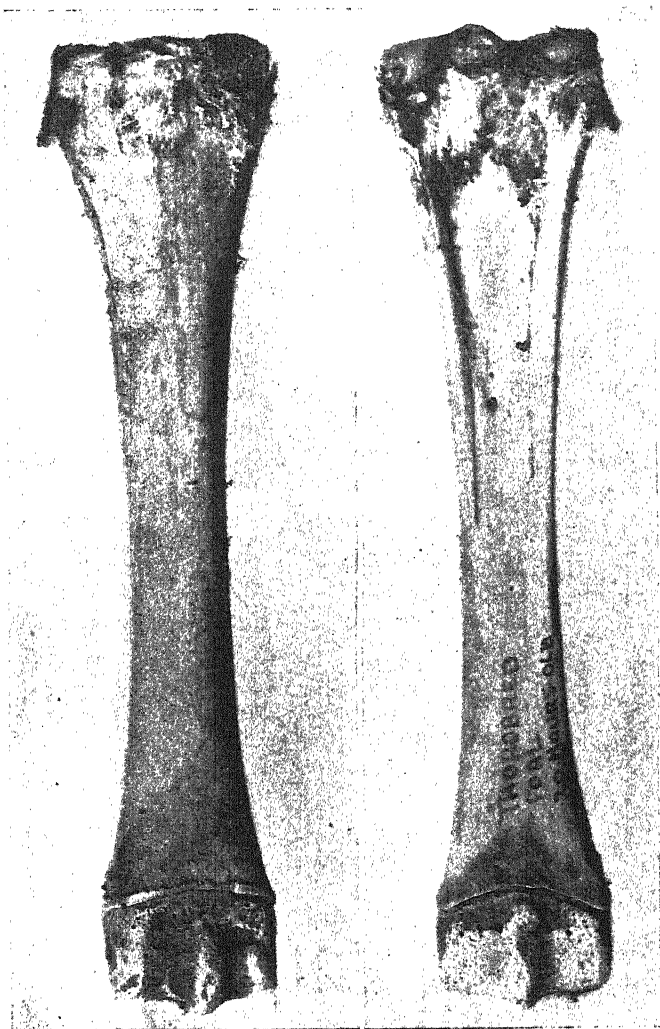
A problem of resistance.

opinion, greater strength is needed. He calls point A in the appended rough diagrams the line of greatest resistance. If he is right—and though he does not pretend to be a scientist his lifelong knowledge of and experience with blood horses gives him authority to speak—this question of increased power of resistance exactly where it is needed is extremely interesting and instructive. Perhaps some more scientific reader can throw light on the theory which should not be left uncontradicted if incorrect.

While hunting men continue to rely on the outside appearance and measurement of bone in the horses they buy, it seems to me likely that coarser horses will be bred from, though they

*Shire (side).**Thoroughbred (side).*

Cannon bones. (Half natural size.)



Front and back of cannon bone of twenty-hour-old thoroughbred foal.
(*Half natural size.*)

do not possess the powers which belong to the horse with the lighter looking but more serviceable bone derived from the thoroughbred. Breeders who think only of their own pockets, though they themselves may know it to be wrong, can scarcely be blamed for supplying what buyers want, and will pay higher prices for. For years past I have ridden ponies of Exmoor and thoroughbred cross, and also with Exmoor, Arab and thoroughbred blood in them. Some of these ponies have been only about 14 hands high, and to the eye their bone has not been big. Several of my friends, whose horses always come from dealers, have passed unflattering remarks. But these same friends have constantly expressed surprise at the powers of my ponies when compared with their bigger-boned horses. The whole truth is that until horse buyers themselves realize that bulk of bone is by no means everything, for so long will the supply of horses with big-looking bones be kept up, because, speaking generally, it means higher prices to the breeder. If as a result of this inquiry and these photographs it is brought home to horse lovers that the bone of the thoroughbred possesses superior qualities, no little good will have been accomplished.

As an interesting postscript, the cannon bone of a thoroughbred foal, only twenty hours old, is added to my illustrations. It is at least surprising what little difference in size there is between it and the adult bone, which is of a seven-year-old race-horse.

REPELLENTS FOR PROTECTING ANIMALS FROM FLIES.

THE biting flies that annoy domestic animals most in this country are the stable-fly, *Stomoxys calcitrans*, and the horn-fly, *Lyperosia irritans*. The bot-flies are not biting flies, but are a menace to domestic animals because of the parasitic habits of their larvæ. This is also the case with the screw-worm fly, *Paralucilia macellaria*, which deposits its eggs in wounds, and a bluebottle-fly, *Lucilia sericata*, occurring in the United Kingdom and Holland, and certain species of Calliphora occurring in Australia, the larvæ of which invade the wool and skin of sheep.

Repellents are more or less effective against all of these flies.

Opinions differ with regard to the injury by biting flies. The common opinion seems to be that these flies are responsible for great losses. However, a limited amount of experimental evidence relating to cattle seems to indicate that the losses, when they occur, are not great.

The repellent action of certain colours has been noted by various investigators. Light-coloured animals suffer less from flies than dark-coloured ones. One author (Marre, 1908) has recorded the observation of a farmer in France who found that a blue colour applied to the inside of stables repelled flies. This observation seems to have remained uncorroborated.

Potassium tellurate has been recommended by Ochmann (1911) as an internal remedy for repelling flies. However, Mayer (1911) failed to obtain results with the remedy, and it seems safe to assume that internal remedies will never prove practicable in repelling flies.

Liquid repellents may be applied by means of a dipping vat, a pail spray pump, an atomizer, or by means of a rag or a paint-brush. The method to be employed depends on the individual preference of the farmer and the nature and cost of the preparation used.

The powder remedies that have been used are pyrethrum powder and tobacco powder.

Various oils, emulsions of oils, and mixtures of oils are used in repelling flies. Crude petroleum, cottonseed oil, fish or train oil, and light coal-tar oil may be used pure. Jensen (1909) recommends for dairy cows an emulsion of crude petroleum containing an admixture of powdered naphthalin.

Fish oil is rated as one of the best repellents and has been used alone and in combination with various other substances. Other substances that have repellent qualities and that have been used in various mixtures are pine tar, oil of tar, crude carbolic acid, oil of penny-royal, and kerosene.

Jensen's formula* is said to protect cows for a week. The

* Common laundry soap	...	...	...	1 lb.
Water	...	...	...	4 gallons.
Crude petroleum	...	...	...	1 gallon.
Powdered naphthalin	...	...	...	4 oz.

Stir well before use.

protective action of fish oil is stated to range from less than two days (Parrott, 1900) to six days. Moore's formula is said to protect for two days. This mixture is safe when applied lightly with a brush, but not when applied liberally with a pail spray pump.

Laurel oil is a very effective repellent. Mayer (1911) found that the protection lasted from two to twelve days. The oil when used pure has an irritating effect unless it is applied lightly. According to Mayer the irritating effect may be overcome by combining it with linseed oil in the proportion of 1 to 10. The present author found that 10 per cent. of laurel oil in cottonseed oil was active for less than a day.

A number of formulas for repellents for application to wounds have been recommended by various authors.

In experimental tests carried out by the present author the following results were obtained:—

A 10 per cent. mixture of crude carbolic acid (21·8 per cent. phenols) in cottonseed oil has a very strong repellent action on flies, but this lasts less than a day, in consequence of which it is necessary to apply the mixture every day. The mixture should be applied lightly with a brush, since a heavy application with a spray pump is likely to cause phenol poisoning.

Mixtures consisting of 10, 20, and 50 per cent. of pine tar in cottonseed oil have marked repellent qualities. They should be applied lightly and it is necessary to apply them every day. A liberal application of a 10 per cent. mixture is deleterious to animals. This is also the case with a half-and-half mixture of pine tar and Beaumont oil when applied lightly with a brush.

A mixture of oil of tar (14 per cent. phenols, volatile with steam) in cottonseed oil and in Beaumont oil has a very marked repellent action. A 10 per cent. mixture of oil of tar in cottonseed oil is safe. A half-and-half mixture of oil of tar and cottonseed oil when applied liberally with a spray pump and 50 per cent. oil of tar in Beaumont oil applied with a brush are not safe. Ten per cent. oil of tar in Beaumont oil is safe. When applied lightly it is necessary to apply 10 per cent. oil of tar in cottonseed oil or 10 per cent. oil of tar in Beaumont oil every day.

Mixtures of 10 per cent. oil of citronella, oil of sassafras, or oil of camphor in cottonseed oil, are powerful repellents, but they are active for less than a day.

A heavy application of fish oil causes the hair to become sticky and fall out. A light application did not produce these results.

Pyrethrum powder is an effective repellent, but its action lasts only for about a day.—*Bulletin of United States Department of Agriculture.*

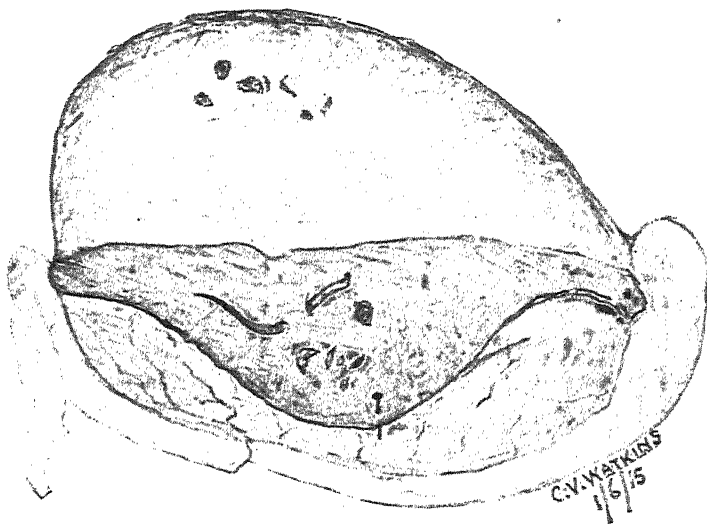
General Clinicals.

STRONGYLUS ARMATUS WORM IN THE TESTICLE OF A CRYPTORCHID.

By FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.

Lieutenant, Army Veterinary Corps, British Expeditionary Force, France.

THE *Strongylus armatus* worm is found fairly frequently in the blood-vessels and surroundings of the testicles of colts when these organs are in their normal situation, but it is not often that they are met with in the interior, and especially are they rarely met with by the cryptorchid operator in abdominally placed testicles. I have been able to obtain records of several such cases,* and herewith add another to the list.



(For this sketch I am indebted to Sergeant C. V. Watkins, Army Veterinary Corps.)

The patient, a very nice black riding horse, 7 years old, was sent into hospital last month by the Veterinary Officer of a Remount Depot, as a very troublesome and useless, unreliable brute, on account of his "rig" propensities.

Upon examination under chloroform it was found that the right testicle had been removed, and as there was trace of a scar on the left side it was presumed that an attempt had also been made to remove the testicle on the left.

* "Castration and Ovariectomy." Published by W. and H. K. Johnston, Edinburgh.

Examination of the inguinal canal revealed nothing there and the abdomen was entered. A testicle fully three times the normal size was discovered close under the loins, the spermatic cord being very cedematous and as thick as three fingers of a man's hand. It was only after considerable manipulation and trouble that it could be drawn sufficiently into the canal to be secured with the écraseur. The body of the testicle was removed first and then the epididymis. Microscopical examination failed to demonstrate the presence of spermatozoa.

When the testicle was cut open a perfect mature specimen of the *S. armatus* worm was discovered *in situ*, as here depicted, and there are also shown the small excavations in which it moved and lived. The exterior of the organ gave no indication by which one might suspect anything abnormal to be present in the interior.

The horse made an excellent recovery and lost all his bad habits.

A PECULIAR BOWEL CASE.*

By M. W. SULLIVAN, D.V.M.

Marcellus, N. Y.

On September 29 I was called to attend to a draft mare, weight 1,400 lb., aged 8 years. Mare had been driven lightly this day, but previously to this had not been used for a couple of weeks. She drove as well as usual but refused to eat grain, so owner notified me. On examination I found mare persisted in lying down most of the time but remained quiet, pulse very weak and fast, temperature about 103° F., and mucous membrane inflamed. I was not positive as to my diagnosis, so told owner she had an attack of indigestion, although I could not account for the fever. I administered heart stimulants, anti-spasmodics and anti-ferments along with a quart of raw linseed oil, and about two hours later the heart beat became stronger, so I departed. I called on animal for several days and fever slowly abated, after which she began eating.

Subject now appeared to be gaining in flesh and to convalesce

* Read before the Central New York Veterinary Medical Association, at Syracuse, November, 1914.

until October 20th, when I received a hurried call to attend her again. This time she was in intense pain, sweating profusely, and showed all the symptoms of acute indigestion. I followed the usual line of treatment, but the hypodermics of arecoline did not cause any purging, but *did* put the mare in intense pain; so I told the owner that I was practically certain mare had a twist of the small intestines, with a fatal prognosis. Animal gradually grew weaker and died the next day. On account of the peculiarities involved in the case I decided to hold a *post-mortem*, which disclosed the following: I found a very marked twist in the small intestines which involved about 3 ft. of the bowel. On running my hand along the twisted section of the bowel I found an adhesion had formed between the bowel and the peritoneal layer of the abdomen. I incised the adhesion and pus escaped; the inside was gangrenous and contained a piece of timothy hay $2\frac{1}{2}$ in. long.

I conclude that the first attack the mare had was when the piece of hay penetrated the bowel, thus causing peritonitis. The apparent relief was due to the piece of hay becoming encapsulated and finally forming this adhesion which caused the animal's death. —*American Veterinary Review.*

STOMACH RUPTURE NOT FATAL.

By E. P. ALTHOUSE.

Sunbury, Pa.

ON November 26, 1914, I was asked to perform an oöphorectomy on a nine-months-old beagle hound bitch. The general condition of the animal was poor and emaciated, but showed a rather large abdomen. After anæsthetizing the patient, I made an incision on the median line posterior to the umbilicus. I had some difficulty in puncturing the peritoneum as it seemed very much thickened. I accomplished it, however, and on introducing the index finger into the abdominal cavity I felt something hard. On removing it, I found it to be the skull of a mouse. On further examination I removed the carcasses of six dead mice.

These foreign bodies had produced a great deal of decomposition, so I decided to continue anæsthesia until death. On *post-mortem*, I found an opening in the right side of the stomach

3 in. in length, with smooth edges, showing that it had existed for some time, and after the dog had swallowed the mice they passed directly into the abdominal cavity. This was a rare case to me and may be of some interest to the profession.

VEGETATIVE ENDOCARDITIS AND CIRRHOSIS OF THE LIVER IN AN AGED BOSTON TERRIER.

By CRITTENDEN ROSS, D.V.M.

New York, N. Y.

IN response to a call to see an aged Boston terrier, I found the patient in pretty bad shape, having had no bowel movement for three days, and had been vomiting for the twenty-four hours preceding the time of my visit. A cathartic was administered and an enema of glycerine given. The latter caused an evacuation of the contents of the lower bowels, but the cathartic was not retained; so after the stomach had had a rest of three-quarters of an hour a second cathartic was given, from which an action resulted. The dog could retain no food upon its stomach, however, being kept alive on liquid peptonoid, which it retained, but still the dog continued to grow weaker and weaker, until it was no longer able to stand or move, when the owner decided to have him put to sleep, which was done.

Autopsy.—The stomach was in a catarrhal condition, as well as the intestines; the distal half of the cæcum was distended with dark tarry fæces, while the remainder of that organ was empty. The heart contained vegetative growths in the right auricular appendix and on the tricuspid and bicuspid valves. The liver showed marked cirrhosis.—*American Veterinary Review.*

A GOAT WITH AN ARTIFICIAL LEG.

A GOAT belonging to Mr. P. J. Carroll, Bailieborough, co. Cavan, Ireland, received an injury to the left foreleg, necessitating its amputation, which operation was successfully performed by Mr. P. G. Connolly, F.R.C.V.S.

The photograph on p. 333 shows the goat wearing an artificial leg.

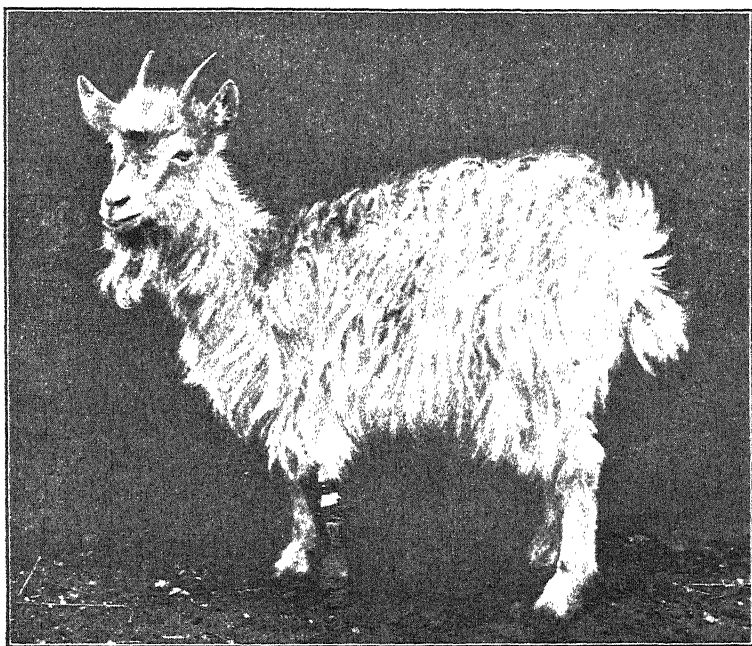


Photo by J. A. Coleman, Baillet-Latour.

A Goat with an Artificial Leg.

EVERSION OF THE RECTUM AND VAGINA IN A SOW.

By C. A. FAST, D.V.M.(1912.)

THE patient was a grade Chester White sow weighing 175 to 200 lb. with second litter of pigs. She was delivered of five healthy pigs, but continued to labour and strain. The next morning I was called again to see her and found the mucosa of vagina and rectum everted, forming a mass as large as a human fist. The prolapsed mucosa was replaced, gauze packs inserted, and a strong bandage applied across the perinæum. The owner was instructed not to feed for a few days. Water was allowed. Three days later the owner reported the sow fully recovered, and I advised him to turn her out with the rest of the hogs.

About ten days later estrum came on and with it a return of the eversion of the vagina and rectum. I decided to operate.

The operation was as follows: After thoroughly irrigating the rectum and vagina I placed a home-made hollow wooden tube in the rectum, ligated, and allowed the prolapsed markedly congested mucosa to protrude. The vaginal mucosa was disinfected, returned, and the lips of the vulva stitched with deep suture, which included the fascia and skin of the perinæum for 1 or $1\frac{1}{2}$ in. on each side.

In three days the protruded ligated mucosa of the rectum sloughed off and the wooden tube passed. Later the stitches in the vulva were removed. The patient made a rapid recovery. At no time was there any increased temperature.

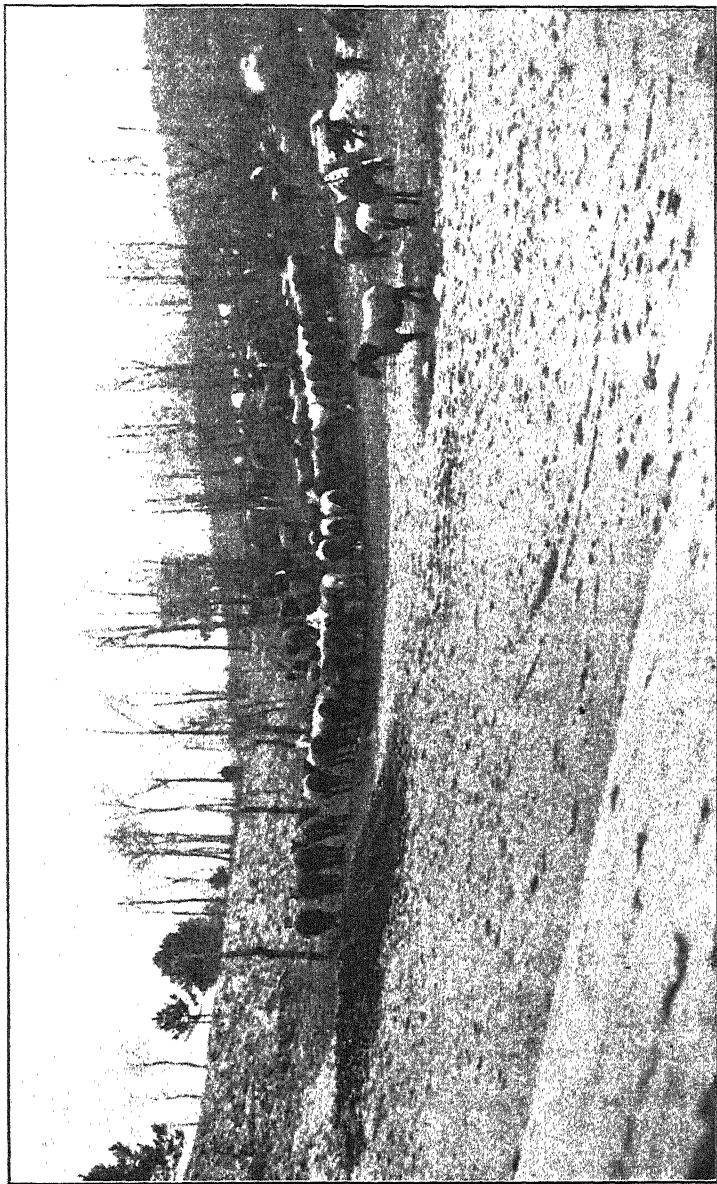
The five pigs died in twenty-four hours due to lack of nourishment.

The wooden tube was made out of an oak pitchfork handle. It was about $1\frac{1}{2}$ by $2\frac{1}{2}$ in., with an opening through its centre $1\frac{1}{4}$ in. in diameter for the passage of the fæces.—*Veterinary Alumni Quarterly*.

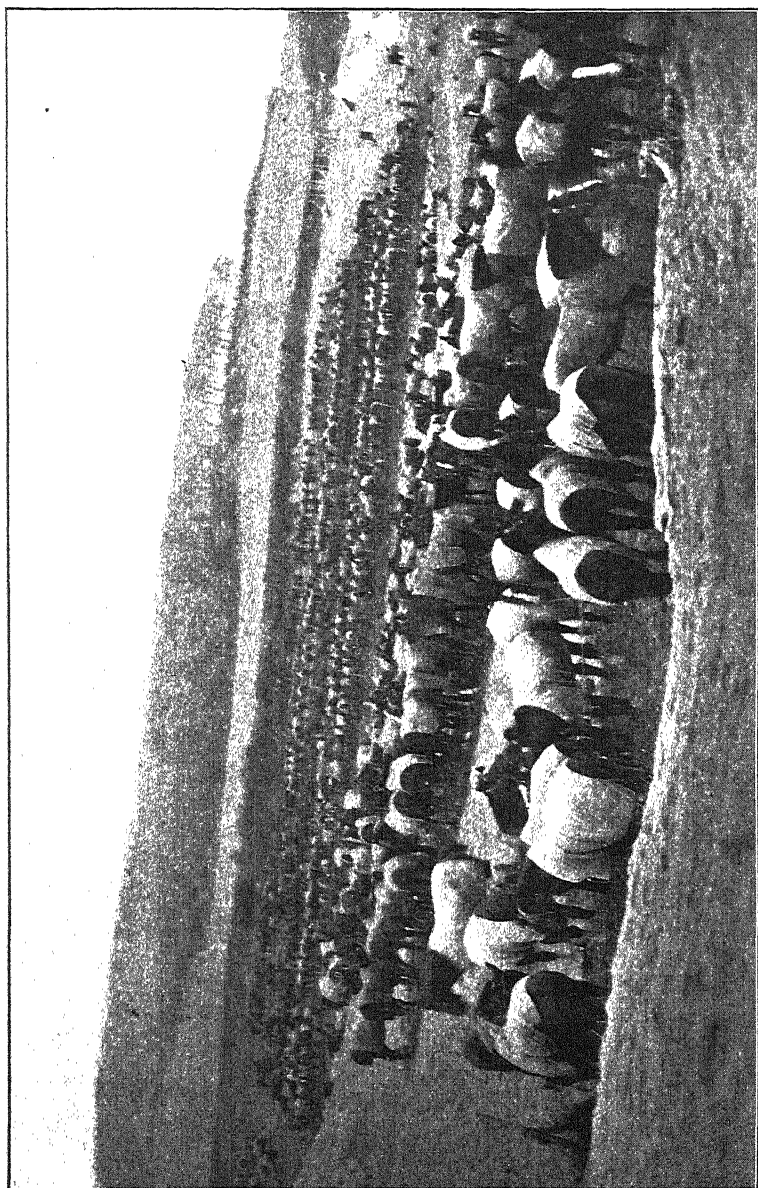
A WRITER in the *Daily Dispatch* writes as follows on the horse famine:—

“It would appear from some facts which came to my knowledge to-day that the Army Remount Department has done its work most effectively, since (according to a leading horse jobber, who is only too sure of the circumstances) there is now scarcely a purchasable horse in the country. On Monday my informant had been to Retford (a journey by rail and motor of 140 miles), only to find that the once important horse fair was a fiasco, not a single horse being seen in the street which was wont to swarm with them on such occasions. Yesterday he made another journey of 40 miles with the same unremunerative result. ‘And,’ said he, ‘not only are there no horses on sale at the fairs, but the whole countryside is bereft of them.’ And this must explain to some extent the backwardness of agricultural work. No wonder that the Army authorities have come to the conclusion that the mule is a much more adaptable animal than is generally believed.”

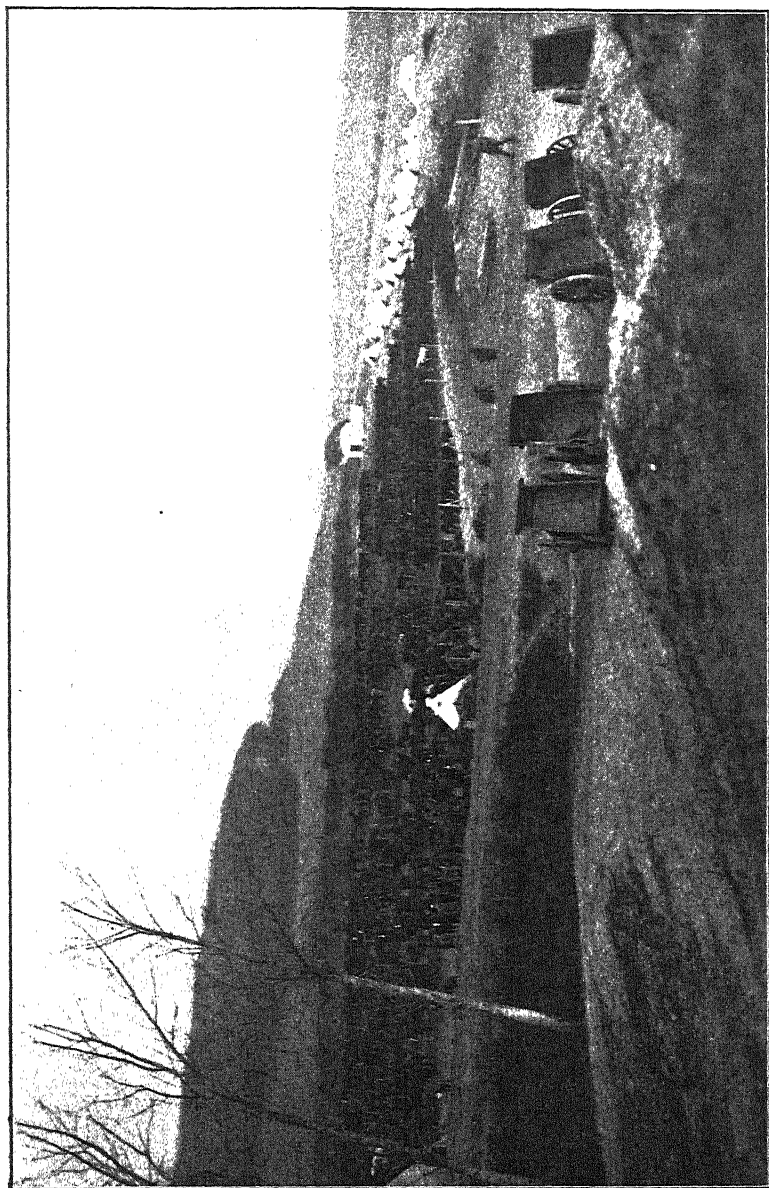
ORIGINAL VIEWS OF ARMY VETERINARY CAMPS WITH THE EXPEDITIONARY
FORCE IN FRANCE.



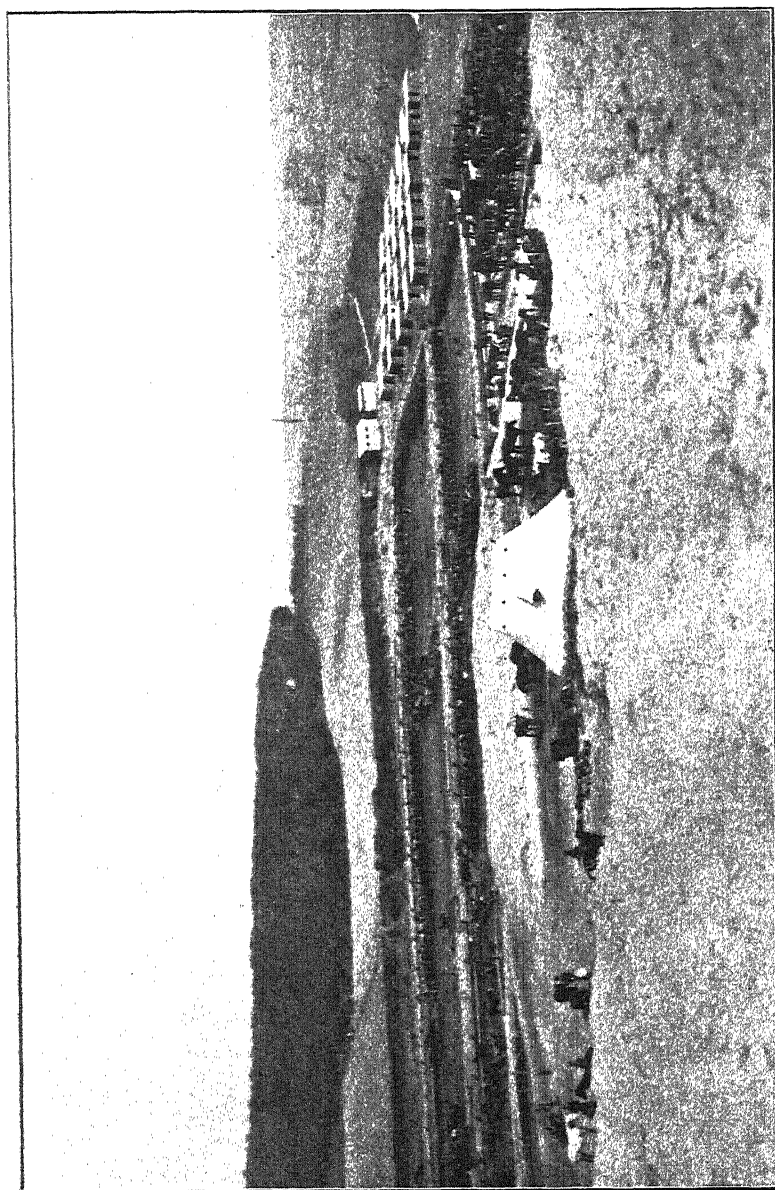
A. V. C. Camp.—Horses suffering from catarrh placed in specially sheltered situation.



A.V.C. Camp (taken in the middle of winter).—Horses are seen clothed for the night. Note the number of horses in the photograph.

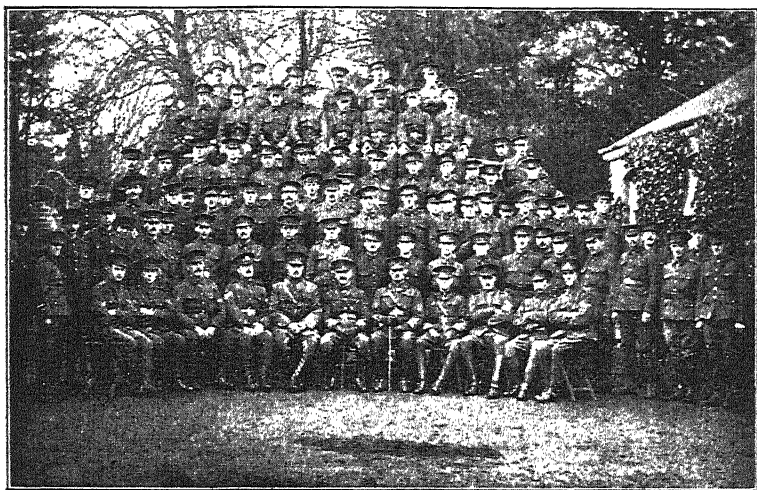


A. V. C. Camp. ---A general view, showing first organization.



A.V.C. Camp.—A general view of the same camp as on preceding page, taken about a month later, showing the rapid and clever conversion of centre of camp. New huts instead of tents also are installed.

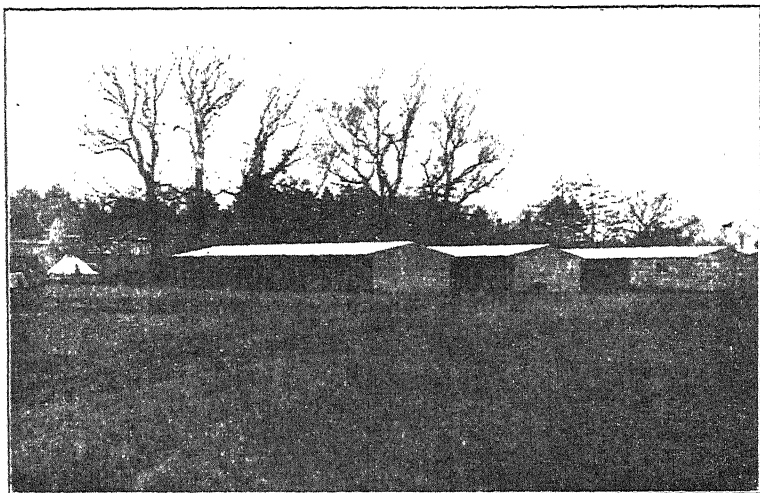
THE VETERINARY CORPS AT WORK AT HOME.



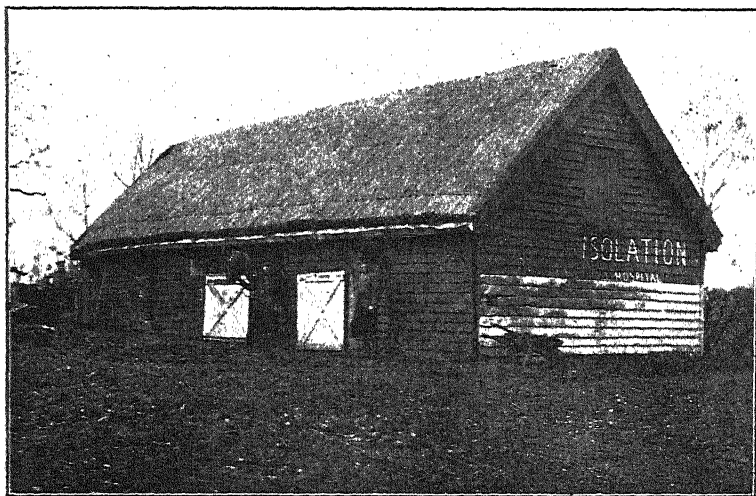
The Staff, 2nd London Division, Field Veterinary Hospital, St. Albans.



Entrance, London Division, Veterinary Hospital, St. Albans.



Some of the Buildings, Veterinary Hospital, St. Albans.



Isolation Hospital, 2nd London Division, Veterinary Hospital, St. Albans.

Abstracts.

CANKER.

By WILFRID STOKES, D.V.M.

Fort Riley, Kansas.

THE outline of my present treatment is as follows:—

- (1) A thorough trimming of the foot.
- (2) Removal of spongy material with a sharp knife.
- (3) A thorough swabbing with a 25 per cent. solution of formalin in 50 per cent. alcohol.
- (4) Covering with a thick layer of pine tar and a *large* mass of oakum.
- (5) Application of a bar shoe and leather.
- (6) Work.

After a few treatments the parts assume a more healthy appearance with lessened discharge which is now cheesy in consistency instead of fluid. The spread of the disease checks and new horn formation is noticed at the margins. The formalin in this strength is drying but does *not* form a scab. The tar forms an oily covering and protects from ground moisture.

Summary.—It was noticed that caustic line of treatment which had previously extended over a long period was valueless, the case getting worse and the animal was kept idle. Caustics, while drying the surface and forming a hard scab, are valueless on account of the irritation which they produce and cause a severe tissue reaction with a marked serous discharge which accumulates under the scab and the macerating action continues and produces a progressive separation of the horn from normal areas, thus bringing about a spread of the condition. Various dry dressings used occasion a similar effect.

Bacterins may be of value in overcoming the secondary infection but are not essential.

The formalin effectively disinfects and the tar keeps the parts clean.

Arsenic may be of value to the derma. It is interesting to note that prolonged treatment with arsenic (Fowler's solution) for canker in the right foot did not influence the developing case in the left.

Pressure is very important as it effectually retards or prevents hypertrophy of the sensitive layer, taking the place of the horny layer.

In order to successfully treat these cases it must be borne in mind that the normal protective covering is missing and the enlargement is due to moisture and irritation. Logical treatment is therefore directed to artificially replacing the missing horny layer and excluding moisture, and is essentially *protective* and not *destructive*.

The essentials of the treatment are the *tar and pressure*, the formalin being simply an aid.—*American Veterinary Review*.

ACUTE, SIMPLE AGALACTIA AND ITS TREATMENT IN COWS.

By M. R. STEFFEN.

Brillion, Wisc.

In dairy cows a condition frequently occurs which can only be described as an acute, simple agalactia.

This trouble is usually sporadic in nature, affecting a single cow now and then without any apparent cause.

The history in these cases is nearly always the same. A cow that is otherwise a good milker suddenly gives only about half the usual quantity and at the very next milking is almost completely dry. In every other respect the animal appears normal; eats good, drinks, appears bright and well. Quite careful examination on the part of the attending veterinarian fails to detect any abnormality of value from a diagnostic standpoint.

It is usual to suspect something wrong with the feed, but this suspicion is discarded because all the other cows in the herd are getting the same feed and are not affected.

Apparently this is a condition induced by trophic nerve disturbance of an obscure character. It is always a purely functional disease; no inflammatory or congestive signs occur in the udder which can be determined clinically. The one and only symptom is the absence of lacteal fluid.

The treatment of this condition is based wholly on this aspect of the pathology of the disease, namely, that it is a purely

functional abnormality, and the treatment is very successful. It is quite important that the case be taken in hand promptly, because, to a great extent, the degree of functioning which again develops as a result of the treatment depends upon the length of time that the glands have been idle. A case of this kind properly treated within a day or two after the milk secretion stops will usually come up to the normal output of milk again.

The treatment consists wholly of the administration of two well-known alkaloids, pilocarpine and strychnine.

Four grains of pilocarpine hydrochloride and $2\frac{1}{2}$ gr. of strychnine sulphate are dissolved in a pint of water. This is divided into three doses, one to be given orally every three hours.

Nothing further is required and usually the glands resume their function promptly. Changed feed or special feed does not seem to hasten recovery in these cases. The fact that such feeds which are in ordinary cases more or less of a galactagogue have no effect in this disease is further evidence that we are dealing here with a trophic nerve disturbance more than anything else. —*American Journal of Veterinary Medicine.*

FOLLICULAR MANGE IN THE DOG.

BY PROFESSOR GR. I. SLAVU.

REVIEWING all the treatment advocated against the rebellious and troublesome disease, the author describes a new treatment which has proved in his hands most satisfactory, having given him lasting radical recoveries. Out of 24 dogs in which the diagnosis had been applied, 16 had the squamous form, localized in some and generalized in the others; 6 had the generalized pustulo-squamous and 2 the papulous. Most of these dogs were in very poor condition. The treatment consists in the application of a phenol camphorated ointment, made of phenol liquid 1 part, pure ordinary camphor 2, white vaseline 6. The treatment requires from nine to sixteen days, according to the severity of the disease.

The technique of the treatment is this—the animal has his coat clipped all over. The body is divided in four parts, every day one part is successively rubbed with the ointment. After four

days a bath of sulphur of potash 2 per cent. is given. The rubbing of the ointment is started on again and the same manipulations carried on three times for mild and four for severe cases. With the pustulous form of the disease it is essential to squeeze out all the pus from the diseased spots before applying the ointment. Sometimes the baths may not be essential, and recovery is obtained just the same.—*Arhiva Veterinar.*

GENERAL ANÆSTHESIA WITH INTRAPERITONEAL INJECTIONS OF CHLORAL HYDRATE.

By GEORGES V. NICHITA, MILIT. V.S.

THIS method of anæsthesia, preconized by Richet for small animals and applied for the first time by Professor Locustaneo for the horse, has been the subject of several experiments made by the writer, which he describes and resumes as follows:—

(1) Intraperitoneal injections of chloral hydrate in horses, donkeys and dogs promote a complete anæsthesia, accompanied with intestinal paralysis.

(2) The anæsthesia is obtained without a previous period of excitement, on an average after 5 minutes in horses, 10 in donkeys, 10 to 15 in dogs.

(3) The best dose of chloral by kilogram weight of the animal is: In horses 0.25 gr. for animals in good condition, and 0.20 gr. for lean and old subjects; in donkeys of 0.35 gr. and 0.30 gr. for pregnant females, in dogs of 0.35 to 0.40 gr.

(4) The anæsthesia lasts on an average: 2 hours in horses, 2½ in donkeys, 1½ to 2 hours in dogs.

(5) Association with subcutaneous injections of morphia does not increase the action of the anæsthesia by intraperitoneal chloral.

(6) One anæsthesia by chloral does not have any influence upon the general condition of an animal, nor does it give rise to any internal macroscopic lesions.

(7) Injections repeated at short intervals are dangerous. They have a local irritating action in all the three species of animals and a general toxic action in horses and donkeys.

(8) Injections of chloral hydrate are a very good and practical mode of anæsthesia for the performance of many operations.—*American Veterinary Review.*

ARMY VETERINARY CORPS.

APPOINTMENTS, PROMOTIONS, AND HONOURS.

War Office, Whitehall.

The following names have been mentioned in dispatches by Field-Marshal J. P. D. French, Commanding-in-Chief, the British Army in the Field, dated May 31:—

GENERAL HEADQUARTERS STAFF, &c.

Colonel E. R. C. Butler, F.R.C.V.S.; Lieutenant-Colonel F. Eassie, D.S.O., A.V.C.; Lieutenant-Colonel A. C. Newsom, A.V.C.; Major E. Brown, D.S.O., A.V.C.; Major F. W. Wilson, F.R.C.V.S., A.V.C.; Captain J. J. Aitken, A.V.C.; Captain H. T. Ryan, F.R.C.V.S., A.V.C.; Captain J. J. B. Tapley, A.V.C.

ARMY VETERINARY CORPS.

Major J. J. Griffith, F.R.C.V.S. (attached R.F.A. 28th Brigade), Major P. J. Harris, Major F. W. Hunt, Veterinary-Major W. A. Pallin, F.R.C.V.S. (Royal Horse Guards), Captain E. P. Argyle, Captain W. J. Dale, Captain H. Gamble, F.R.C.V.S., Captain M. St. G. Glasse, Captain R. W. Mellard, Captain W. W. R. Neale, Captain W. H. Simpson, Captain W. H. Walker, Lieutenant W. A. J. Buchanan (Special Reserve), Lieutenant C. Davenport, Lieutenant H. E. A. L. Irwin, Lieutenant G. C. Lancaster (Special Reserve), Lieutenant W. McG. Mitchell (Special Reserve), Lieutenant P. B. Riley (Special Reserve), Lieutenant F. B. Sneyd (Special Reserve), Temporary Lieutenant J. M. Dawson, Temporary Lieutenant J. Sherley.

Sergeant-Major A. Hirtes, Unattached List, Indian Sub-ordinate Veterinary Establishment, India Miscellaneous List.

261 Temporary Staff-Sergeant C. Marson, S.E. 176 Sergeant A. Lawie.

HONOURS.

The King has been graciously pleased to give directions for the following promotions in, and appointments to, the Most Distinguished Order of Saint Michael and Saint George, for services rendered in connection with Military Operations in the Field:—

To be Additional Members of the Second Class, or Knights Commanders: Colonel E. R. C. Butler, F.R.C.V.S., A.V.C.; Major F. W. Hunt, A.V.C.

His Majesty the King has been graciously pleased to approve of the following Honours and Awards for Distinguished Service in the Field:—

STAFF.

To be Brevet Lieutenant-Colonel: Major F. W. Wilson, F.R.C.V.S., A.V.C.

To be Companion of the D.S.O.: Captain J. J. B. Tapley, A.V.C.

REGULAR FORCES. ARMY VETERINARY CORPS.

Captain A. F. Deacon to be Temporary Major.

To be Temporary Lieutenants: H. Barnard, W. L. Richardson, L. W. Heelis, J. E. Hutchinson, J. M. Crowe, C. W. Finnemore, F. S. Warburton, F. Booth, A. E. Bayley, P. G. Ledger, G. E. Hamilton, H. G. Simpson, F.R.C.V.S., A. S. Ferguson, G. Simons, J. M. White, J. T. Evans, F. Birkin, M. McPhatter, T. B. Harries, R. T. James, C. O. Maconachie, T. F. Hotchkis, B. P. Boyle, W. Scott.

Commission of Temporary Lieutenant F. W. Gokey is cancelled.

Temporary Lieutenants relinquish their commissions: J. A. Buchan (dated May 24), C. D. Stewart (dated June 3). Temporary Lieutenant R. S. Collihole relinquishes his commission on account of ill-health.

TERRITORIAL FORCE. ARMY VETERINARY CORPS.

To be Major: Captain J. Peddie.

Captain W. L. Harrison, F.R.C.V.S., to be Temporary Major.

The promotion of Captain T. D. Young is antedated to May 11.

Lieutenant A. J. Hines to be Temporary Captain.

J. H. Lockwood (late Veterinary Captain Imperial Yeomanry) to be Temporary Captain. Dated June 15.

To be Lieutenants: L. Crook, G. L. Harber, W. Bushnell, R. H. Stephenson, G. F. J. Prickett, H. Gibson, A. Douglas, H. P. Whipp, C. E. Norgate, Q. A. Stewart, G. W. Balfour.

M. J. Hime (late Lieutenant and Quartermaster Natal Veterinary Corps) to be Lieutenant.

To be Temporary Quartermaster with honorary rank of Lieutenant: J. Hyde (dated May 30), H. R. Rose (dated June 1).

OVERSEA CONTINGENTS. CANADIAN A.V.C.

Captain J. J. McCarry relinquishes his temporary commission. Dated May 7.

Reviews.

The Journal of the Board of Agriculture, June, 1915. Price 4d. Printed by Jas. Truscott and Son, Limited, Suffolk Lane, E.C. Published by the Board of Agriculture and Fisheries, Whitehall Place, London, S.W.

The June number of this well-known agricultural periodical maintains the good reputation of previous monthly issues. If the provision of handy markets, of co-operation in production, buying and selling, are the root and essential forces necessary for the maximum output of agriculture and for the real benefit of the people of these Isles, then the article by A. W. Ashby on "Suggestions from America for Co-operative Selling," which touches aptly on one phase of the question, ought to be of primary value and first importance. It is a piece of writing well worth perusal by all heads of distributing centres. "The Cultivation of Sugar Beet in the West of England," by C. S. Orwin, M.A., and J. Orr, M.A., advocates the suitability of Cornwall for this operation. Any increase of area for sugar beet cultivation is for the national benefit. Useful advice is given on the pages devoted to "Soils and Agriculture of North Wales." "The Prevention of Egg-laying on Turnips by the Diamond-back Moth," and "Experiments on American Gooseberry Mildew in Cambridgeshire." The Irish pig-breeding industry has declined somewhat in recent years, and keeping of pigs by artisans has decreased. Several reasons are given for this: dislike of additional Sunday work, lack of housing accommodation, sanitary restrictions, and substitution of poultry and eggs for pigs, but the authorities consider that the Irish pig-breeding industry will be in a very favourable position in the immediate future because of shortage in Canada, U.S.A., Denmark, and the Continent. The Annual Nutrition Institute of Cambridge University is doing work of paramount importance at the present period, for it is giving expert advice on the cheapest food for all stock from month to month at a time when this country is going through an era of stress hardly ever known before.

The pages devoted to a summary of agricultural experiments are very educative and show that agricultural research is alive and making headway, in various parts of our country. The

Journal of the Board of Agriculture should be in the hands of every progressive agriculturist and on the table of all agricultural scientists.

G. M.

A Bacteriological Study of Methods for the Disinfection of Hides infected with Anthrax Spores. By F. W. Tilley. Reprint from *Journal of Agricultural Research*, Department of Agriculture, Washington, U.S.A.

Mr. Tilley, who is the Senior Bacteriologist, Biochemic Division, Bureau of Animal Industry, has given in this pamphlet the history and result of his valuable researches into the question of rendering anthrax hides innocuous to their handlers. The spores of anthrax in hides are found chiefly in connection with bloodstains, and these and other habitats of the organisms are chiefly colloidal in nature. The problem has been to get at the anthrax spores when embedded in a gelatinous, albuminous, or other colloidal body, without injury to the material or fabric to be disinfected. Searching experiments have been conducted and it has been found that two methods of effective disinfection may be employed. The one called the Seymour-Jones method consists in the use of dilutions of mercuric chloride 1 to 2,500 plus 1 per cent. of formic acid, provided the treated hides are not to be subjected within a week or two to the action of any substance that will neutralize the disinfectant. This would be the case, for instance, if hides were disinfected at foreign ports before shipment to this country; the other method, named the Schattenfroh method, consists of employing hydrochloric acid and sodium chloride in the proportions of 2 per cent. of the acid and 10 per cent. of the salt with forty-eight hours' exposure. This procedure is entirely satisfactory. Neither method exerts any injurious effect for tanning purposes upon hides or leather.

G. M.

Translations.

OUR HORSE STOCK, HORSE BREEDING, AND THE WAR.

A SHORT time after the commencement of war an article appeared in the daily press with the title, "The Coming Horse Shortage." It was written by a veterinary officer and was marked by unfavourable prophecies. The commandeering of horse material through the mobilization of the Swiss Army and the sudden cessation of all importing produced their inevitable effects, chiefly on agriculture, in an unexpected form. The lack of horse power produced far more marked results on the gathering of the harvest and the tillage of the fields than the scarcity of man's labour. This fact at the time caused a great and noticeable demand for horses under the age of 4 years (these not being requisitioned). This great request caused a corresponding rise in price for horses of this class, and the figure rose to a height never known before. Where in normal times a good two-year-old colt or filly cost about 800 francs, now they fetch an average of 1,200 francs. A comparison of this circumstance with the maximal valuation given for requisitioned horses shows that the highest figure given under the regulation for commandeering horses is too low. As things were, a suitable revision of the condition was very urgent.

In view of the present and future effect of the lack of horses a memorial was drawn up by the principal horse-breeding societies in Switzerland for presentation to the Department of Agriculture. The Swiss Military Department, by a quickly issued Order, has fully met the views of the memorialists. The official heads of the horse-breeding societies were well received and their views were accepted and are to be furthered by the State. Measures are to be taken to make use of all mares suitable for breeding and not to requisition them for Army purposes. Attempts are to be made to put double the number of mares to the horse than in former years. It is suggested that the stallions, which now cover eighty mares each on an average in the season, may have a larger mare figure given them, and in the case of thoroughbreds the annual supply may be increased by twenty. There is to be a speeding up of home-breeding all round in Switzerland, for she recognizes that all sources of outside equine supply will be closed for many years.—*Swiss Journal of Veterinary Medicine.* G. M.

FIELD OBSERVATIONS AMONG GERMAN HORSES
(RECORDED IN JANUARY) ABOUT VERDUN.

BY VETERINARY-SURGEON BAMBAUER.

DURING a severe outbreak of strangles the horses had to remain saddled and harnessed out in the open. In November there was wind, cold, rain and snow, and we bivouacked under the sky, or, if favoured, in fir plantations. The ground was sodden and the horses sank up to their knees therein and lost a considerable number of shoes. There was only a limited ration of oats and for rough food the horses ate fallen fir leaves, withered wood grasses and shrubs, bark of trees, and even saddle-cloths and nosebags.

The shoeing of the horses was in many cases faulty at the time of mobilization. Shoeing in the field was a matter of much difficulty and iron of the wrong size being supplied made matters worse. In future horses should be well shod before entering the service. The usual traumatism of horses on the march occurred frequently. Saddle and harness sores arose chiefly through the settling of chalky meal like dust on the coat, and stiff and angular leather gear. There were not a few picked up nails. Laminitis, strangles, influenza, purpura, lumbago, &c., were frequent. Only six cases of colic occurred among 650 horses during a period of five months.

When the regiment came into the zone of fire war injuries were frequent. The loss was not great, however, because shelter and cover outside the direct line of fire was sought and new positions and fresh munitions were obtained under shelter of darkness.

The spreading away of artillery missiles behind the firing-line endangered not only the gun teams but allowed the horses no rest and quiet.

Injuries from artillery projectiles, shells, and shrapnel caused large, deep, torn, and shreddy wounds, always earth soiled when caused by missiles striking off the ground. Even bits the size of a lentil seed caused severe injury. Healing of such wounds in the neck, breast, back and croup muscles was only brought about slowly and with difficulty, because the removal of splinters from the deep layer of muscles was almost impossible and supuration and fistula formation regularly occurred. Comparatively insignificant were the cases of profuse hæmorrhage from such contused wounds. The effect of shell injuries when horses were near the bursting spot was frightful. Entire limbs were torn away, bodies scattered abroad, holes the size of one's head made in the abdomen, and bowels escaping in metre lengths.

Shrapnel balls frequently lodged superficially in the muscles and were often found just under the skin over bones or tendons. One horse struck over the hip-joint had the ball taken out at the stifle. The author warns against too hasty destruction of shot-injured animals. Even very severe wounds often take good ways. Wounds were covered or, if possible, bandaged after

painting with tincture of iodine. Pieces of muslin or gauze were chiefly used as protection. In rainy weather large wounds were treated by inserting and withdrawing muslin tampons soaked in tincture of iodine. All washing or interference with the wounds by fingers or instruments and probing for deeply situated shot was avoided. Blood clots, necrotic tissue, dirt, secretions, and superficially situated foreign bodies were removed. No cases of tetanus occurred through the iodine treatment, which is contrary to the experience in man. Shot and splinters may be leisurely removed after granulation has occurred, and fever, diminished appetite, local swelling and lameness have subsided. Strangles and influenza caused the greatest losses from infectious diseases and outbreaks of the former were very virulent and frequently fatal. The supply of drugs at the commencement of the War was insufficient, but later on it improved. Aloes balls, wadding in rolls and in small packages, and dry lead and alum mixture were vital necessities. The students apportioned as assistants to the veterinary surgeon having only had one or two sessions at clinical work, were often cause for complaint on account of faulty training, lack of knowledge, and clumsiness.

The author comes to the conclusion that a staff veterinary surgeon should always have two riding horses so that he may be in a position to take his assistant with him wherever his services are required.—*Swiss Journal of Veterinary Medicine*.

G. M.

DEATH OF CAPTAIN A. C. ANDERSON, A.V.C.

THIS occurred in front of the Chatelaine Hotel, at Ypres, on April 20. Captain Anderson had his quarters in the remains of the Hotel Chatelaine, he being the A.D.V.S. of the 27th Division at the time. The hotel had been almost destroyed by the German shell-fire.

On the morning of the 20th, as he was coming out of his office, on hearing a shell coming in his direction he ran in between two horses for cover. The shell burst and a portion struck him full in the face, killing him instantly.

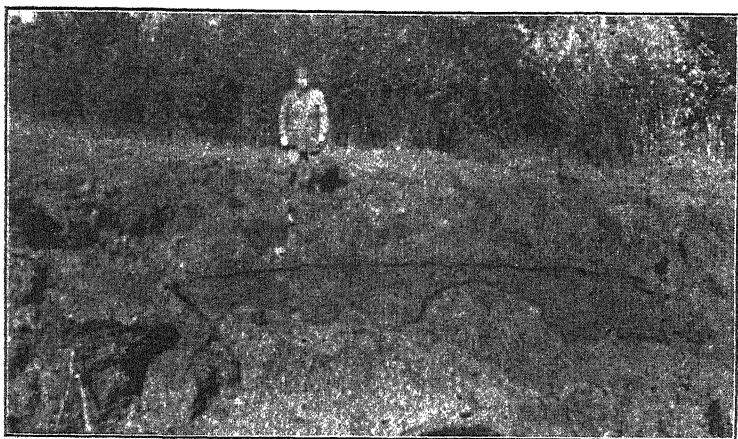
His French interpreter was close by at the time but, except for shock, escaped unhurt.

THE DEATH OF LIEUTENANT FOX, A.V.C.

LIEUTENANT FOX, when on the retreat, was killed whilst dressing wounded soldiers in a church—a duty to which he had been allotted as the medical officer was missing. A shell burst in the church killing most of the wounded, and the body of Lieutenant Fox was afterwards found by his Farrier-Major, who had returned to find him. His body was not at all disfigured, in fact, had no mark upon it, death having been due to the concussion.

THE PLACE WHERE LIEUTENANT BRAINSBY JONES,
A.V.C., WAS KILLED.

THIS photograph, taken by a brother officer (who has since been killed), shows the hole (14 ft. diameter and 10 ft. deep) made close to the Moulins—Bourg Road by a "Black Maria."



Lieutenant Brainsby Jones was sitting on his horse some yards away reading a letter from home at the time the shell fell. A large fragment struck him on the thigh and injured him severely. He was taken down to the field ambulance, and from thence to the base hospital, where he died.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.



THE LATE LIEUTENANT J. W. BROWNLESS, M.R.C.V.S.,
Army Veterinary Corps.
(Killed whilst on active service in the Dardanelles.)

THE VETERINARY JOURNAL

AUGUST, 1915.

Editorial.

ON ENCOURAGEMENT.

ONE of the characters in the play of "Sweet Lavender" moralizes thus: "Blame, blame, always blame, but praise—oh, no, never! Much may be done by kindness." Leading gets more willing and reliable work out of men than driving ever can do. Encouragement by kindly advice and sympathy, or by material help and backing up, produces a better spirit for effort than hostile censure or faint praise. Constructive criticism enlightens the difficulties or reduces the defects of the person or thing criticized, and points to a better road than the cul-de-sac indicated by mere sterile and depressing denunciation. There are times in the life of a profession when the upbraiding voice should be heard and there are threatening innovations (such as the employment of unqualified assistants) which need countering, and when all those who have a love of right and justice must speak out boldly in defence of the true interests of the body corporate to which they have the honour and privilege to belong. We do not wish to assert that the sympathetic and encouraging note is always justified. The whole labour field of investigation, teaching, and practice, however, will be best cultivated by co-operation and understanding among clinicians, laboratory workers, practitioners, and teachers. An intuitive sympathy among the varied departments of effort is essential to true progress, to enable the profession to give its best service to the country and to keep abreast of the ever-advancing march of science. To justify its existence a body of scientific men must always be striving to throw more light on the problems of disease, to produce the best possible results in grappling with them, and to show marked ability in overcoming them. When an individual or profession has done the best in a field of labour concerned, they will advance all the more spiritedly and light-heartedly if they receive encouragement. We are so constituted that a pat on the back, a word of commendation, or a material reward will produce as good an effect on us in incitement to further action and per-

severance as in the case of that very human mortal Dick Phenyll, a chief character in the play of "Sweet Lavender."

Among ourselves we have tried to encourage individual effort by establishing, through the help of giants among us, such awards for merit as the Jubilee Memorial and Bursary Prize, the Fitzwygram Prizes, the Walley, the Williams, and the John Henry Steel Memorial Prizes. Recently we are pleased to note that veterinary science has been recognized by the State in the granting of the award of a Civil List pension to the children of the late William Hunting. If the amount of this is not as liberal as some of us think it might have been, the stress of the times has to be taken into consideration, and in any case it is a landmark in the history of our profession. The searchlight of the War has done us good in bringing our services to the State into a prominence which they would scarcely have achieved otherwise, and another fact for our encouragement is the granting of the rank of Captain on joining the Army Veterinary Corps to those of our members of five years' standing in the Civil Services. But why is this concession limited to these men? Are there not others equally worthy?

We still think that the State might do more to stimulate the advancement of the profession in the fields of research, instruction, and education. When a true understanding of our desires and aims and a just appreciation of our efforts, with the limited advantages given us, are absorbed by those with influence in high places and by the holders of the places themselves, we shall then expect to receive our due and right position in the economic and scientific activities of the nation. Not infrequently an empty-headed politician or a pseudo-statesman runs our little body down and seeks to trample it in the mire. As a rule, the ignorance of this individual is only equalled by his "superior person" air. Men of this kidney are common to every land. They usually "lend a willing ear to uninformed assertions concerning the work of disinterested and competent public servants."

The truly paternal State will not only keep a look out for special merit in the ranks of those attached to it officially and reward them proportionately, but it will also cast a roving eye over all workers in our fields, and occasionally remember that "whilst generals may win battles, wars are won by the rank and file." The timely recognition of the special services of a lieutenant in the army of erstwhile civilian professional men will be appreciated as much as a large grant of money to a successful general.

G. M.

General Articles.

A PRELIMINARY NOTE UPON THE INTRA-DERMAL-PALPEBRAL METHOD OF MALLEIN TESTING FOR GLANDERS.

By the courtesy of the French military authorities, on July 9 a very interesting demonstration of the value of the above method of testing with mallein was given by Professor Douville (of the Lyons Veterinary School, now serving as a lieutenant in the French Army), in the presence of Brigadier-General Moore, Colonels Butler and Newsome, Majors Oliver, O'Rourke, and Wadley, Lieutenant Hobday, and a number of other veterinary officers.

The results were so convincing, and this demonstration was so skilfully carried out, that it was at once decided to give the method a thorough trial in the British Service.

This method of testing with mallein has been for some time on trial in the French Army, and the results have been reported upon most favourably, so much so that, under war conditions, at any rate, it is probable that it will supplant the subcutaneous method almost entirely.

The chief advantages claimed for it are that the dosage is very much less, thus saving mallein, and necessitating less material to be carried or sent about the country (a very great asset where thousands of horses have to be tested); secondly, the reaction is so pronounced that a decisive opinion can be given with much more confidence than one is able to sometimes do by the subcutaneous method; thirdly, there is no need whatever to take any temperatures, and the test can be carried out on feverish animals and in any surroundings.

An ordinary small 1 grm. syringe (Pravaz or other pattern), with screw piston graduated to $\frac{1}{10}$ c.c., is used, and the needle should only be about $\frac{1}{2}$ in. in length.

Of mallein, as at present supplied for the British Army Service, instead of a dosage of 1 c.c. only 2 minims are necessary. In the French Army mallein is obtained from the Pasteur Institute, and a special concentration of 1 to 3 (malléine diluée au quatrième pour intra-dermo-reaction) is prepared.



FIG. 1.

Side view showing the reaction after injection into the lower lid of a glandered horse.



FIG. 2.

Front view of a "reactor." Note the muco-purulent discharge from the inner canthus.

The injection is made into the skin of the eyelid, the lower for preference, although either will do.

In the majority of horses the head is merely held by an assistant; or, if the animal is at all restless, a twitch may be applied.

The operator, standing by the cheek, with the syringe in the right hand, carefully inserts the needle parallel to the eyelid into the layers of the dermis itself, and not subcutaneously (although no harm results, even if it does penetrate into the subcutaneous tissue), holding a fold of the eyelid between the finger and thumb of the other hand. The piston, the dose having been previously graduated by the screw upon it, is then pressed and the dose inserted.

The result is as follows:—

In healthy animals the eyelid remains unchanged, or becomes only very slightly swollen between the second and sixth hours, this swelling disappearing about the twelfth hour. In a glandered horse there is a very characteristic reaction. This takes the form of severe and extremely sensitive œdema of the eyelid, accompanied by a more or less profuse mucous discharge, the conjunctiva being bloodshot and the eye more or less closed.



FIG. 3.

A typical reaction
(lower lid injection).

If the horse has previously had a subcutaneous mallein test, a delay of twenty days should elapse before resorting to the intradermal method.

Out of between 5,000 and 6,000 mallein tests made during the past eight months the intradermal test never failed, all reactors being proved on *post-mortem* to be glandered.

In almost every case there was agreement in result between the palpebral and the subcutaneous methods, but in a few instances animals were met with

The reaction is readily visible about the ninth or tenth hour after the injection, and is at its height between the twenty-fourth and thirty-sixth hours, remaining sometimes for three or four days.

In the event of a doubtful or incomplete result, an injection of 2 minims into the other eyelid may be given forty-eight hours later.

The swelling will persist in a glandered horse for three or four days and then gradually disappear.

Hypodermic injections in the usual site in the neck can, if the operator wishes, be done at the same time as the injection into the eyelid, and in a glandered horse each will act equally well.



FIG. 4.

A typical reaction (upper lid injection).

which reacted definitely to the intra-dermal-palpebral test, but in which the hypodermic test in the neck was indecisive. In all cases the *post-mortem* examination proved the diagnosis based upon the intra-dermal reaction to be accurate.

ON THE EMPLOYMENT OF POLYVALENT SERUM IN VETERINARY MEDICINE.

BY MONSIEUR L. CUVILLIER.

Alfort Veterinary School, Paris.

EVERY time that a microbe penetrates a point of the body it produces a defensive reaction interpreted by an afflux of leucocytes, which, passing out of the vessels by diapedesis, move in great numbers to meet the invading element. Diapedesis is followed in the great majority of cases by phagocytosis of the germs which are for the most part surrounded by white cells. From then these suffer a very varied fate, according to the pathogenic value and the toxicity of the microbial agents which they have ingested: if the digestion of the atoxic or little virulent bacteria is effected normally, that of the pathogenic and toxic microbes is unrealizable, and the leucocyte does not delay at all to succumb to the action of the germ. White cells thus destroyed are lost for organic defence, for regeneration of the tissues; they constitute the figurative fundamental element of pus.

Antiseptic medication, so largely used to-day, proposes to destroy on the surface of infected wounds and mucosæ the organisms that multiply there. To this end it uses different chemical or physical agents, which all proceed by oxidation of bacterian protoplasm or by coagulation of this substance. But for those who know the very real resistance of bacterial protoplasm to different agents, it appears beyond dispute that before reaching the microbial element the antiseptic exercises its action violently on the cells of the wound concerned, and notably on those very young and fragile elements which co-operate in its repair, and violently also on the leucocytes whose chemiotaxis has been a long time established.

The opposition is flagrant between the artificial means of making wounds healthy, or of the protection of the tissues which represents the antiseptic medication, and the physiological process of defence and repair of tissuelary lesions.

A well-thought-out medication ought at least to favour the play of physiological functions, if not to assure and determine it, to hasten its manifestation. To this point respond the researches of Messieurs Leclainche and Vallée, presented for the first time by these authors in a note to the "Académie des Sciences" in March, 1912. According to these authors, the ideal of a reparative medication of wounds ought to have as its aim and end the determination of a *total and useful phagocytosis* of germs encountered there. Only the "sensibilizatrices," specific antibodies of sera of animals hyper-immunized against pyogenic microbes, are capable of provoking it. And the method offers, moreover, evident interest, since the researches of Carrel, recognized already by R. Petit, on bathing with a serum, a highly physiological element, to bring about repair of tissues.

Having personally employed this serum for two years in various hospital services of Paris for the treatment of infected wounds, and having obtained in all cases an almost immediate diminution of suppuration, followed by rapid repair of the tissues, we have thought that its application in veterinary medicine would produce the same effects as in human medicine. In animals wounds are largely infected and protected with difficulty, also in many cases tissues reform slowly, hence prolonged disuse of the animal.

Bacteriological researches carried out on various lots of pus have revealed in the majority of cases the presence of various staphylococci, and rarely streptococci. The equine producers of serum being treated with the view of specially furnishing sensibilizatrices, the polyvalent serum ought, in order to produce its maximum effect, to be in direct contact with the tissues infected. When dealing with penetrating jagged wounds one endeavours largely to trim away the mortified tissues; this mode of procedure does not present any inconvenience, for repair is as clean in the depth of the wound as on the surface. When by reason of the anatomical situation of the lesion trimming is not possible it is necessary to make the serum penetrate into all the tracks, either by injecting or by means of tampons of gauze. Whatever the

case, the wounds ought to be previously washed with the physiological water in such a way as to obtain as perfect a cleansing as possible without altering the cells.

The cases treated with the devoted help of veterinary assistant Monsieur Granmont, and M. Hugot, veterinary pupil, have been numerous [we hope in the next issue to give particulars of these cases.—Translator], and they bear principally on wounds situated principally in the region of the withers or limbs, wounds necessitating perfect cicatrization before the horse can be used.

Among the observations taken we shall note certain cases of wounds treated primitively with antiseptics, then with polyvalent serum, and others treated exclusively with polyvalent serum.

The history of the cases given is not only of interest in demonstrating the efficacy of polyvalent serum in the treatment of suppurating wounds in the horse; it confirms the specific nature of its established effects in human therapeutics. In their notes to the "Académie des Sciences" and "Académie de Médecine," Messieurs Leclainche and Vallée have already insisted and brought forward different arguments in favour of the specificity of the properties of their serum. Our *confrère* and friend Ramon has been able experimentally to verify this quality, and our clinical observations give him support of undoubted value.

Polyvalent serum acts on suppuration, and the infection of wounds, principally in favour of different antibodies; its happy action on the horse establishes its sovereignty.

Is it not a point of all the evidence that normal horse serum, if perhaps of some activity in different human and animal species, cannot exercise any favourable influence on the horse itself, which is apt to a spontaneous auto-serotherapy of its own lesions.

If this were so, the animal ought always to cure its own lesions without the help of any intervention. It is, however, to the multiple antibodies that it contains that polyvalent serum, indeed, owes its principal activity, and not at all to the sole physiological qualities which it partakes of with normal serum. This establishes the real superiority which its employment presents in human therapeutics.

G. M.

OFFICIAL INSTRUCTIONS ISSUED FOR THE USE OF
SPECIFIC POLYVALENT SERUM FOR THE DRESS-
ING OF WOUNDS.

BY PROFESSORS LECLAINCHE AND VALLEE.

The Veterinary School, Alfort.

THIS serum, produced by horses immunized against the organisms of diverse suppurations (staphylococci, streptococci, coli bacilli, pyocyanic bacilli, &c.) and of gaseous gangrene (vibron, septic, *B. perfringens*), according to the method of Leclainche and Vallée, possesses at the same time the advantages recognized in normal serum and those which result from the presence of *specific antibodies*.

By its *physiological qualities* the serum forms on wounds and inflamed mucosæ an isolating layer, and constitutes an occasional medium eminently favourable to the rapid regeneration of anatomical elements to the success of grafting, to the safeguard and regeneration of cutaneous flaps, muscular or mutilated organs (fingers, toes), which without it would require excision. It is a precious and incomparable help to conservative surgery. It diminishes pain and causes it to disappear (extensive wounds, burns).

By its *specific properties* the polyvalent serum ensures the phagocytosis of organisms; it modifies rapidly, then dries up suppuration, or hinders its development; by its action on anaerobes and microbes that favour their multiplication it avoids indirectly the formidable complications of gaseous gangrene.

In contradistinction to antiseptics which paralyse and coagulate at the same time the microbe and the cells of the tissues, the serum protects the latter and affects the microbe only.

Employed in dressing of infected wounds, it realizes a physiological antiseptism expressed by immediate modification of suppuration and its progressive disappearance, followed by hasty cicatrization.

Used as lavages and dressings as a *preventive* in surgical operations susceptible to post-operative complications (soiled or infected serosa, progressive gangrene) it brings about normal repair of the lesion.

MODE OF USE.

The employment of serum *exclusive of all other antiseptic medication* is carried out as follows:—

(1) Practise a complete lavage of the surfaces to be treated, with a boiled, lukewarm solution of sodium chloride 9 per 1,000 in water, distilled for preference.

(2) According to the case, apply on the wound layers of simple sterilized gauze soaked in serum, or introduce a tampon soaked in serum into the fistulous tracks or cavities, or inject the serum without dilution.

(3) Apply a dry protective dressing.

(4) Renew the dressing of polyvalent serum as often as necessary and according to the indications of each case. Prolonged use of the serum does not lead to any anaphylactic or other accident.

(5) Each flask issued or ampoule opened ought to be used immediately. Only contraindication: cerebral surgery.—*Revue générale de Médecine vétérinaire*, July 1, 1915.

G. M.

THE MAMMALIAN CÆCUM.

By WALTER STAPLEY, M.R.C.V.S., M.D., D.V.Sc.

Cambridge, New Zealand.

It is to be regretted that academic authorities have stated that bears have lost the cæcum by retrogressive changes, that the double cæcum of birds is fit for direct comparison with the mammalian cæcum, and that the vermiform appendix is a lymph gland and not a vestige of the cæcum of ancestral man; for not only do these erroneous statements serve to confuse the history of the cæcum, but they divert the study of the subject from its proper sphere, the consideration of the differentiation of the simple gut into small intestines and large bowels.

The evolution of the large bowels expresses the adaptation of the simple gut to the digestion of coarse vegetation, such as grass and leaves. In those types through which mammals have passed, fish, amphibian, and reptile with less than seven neck bones, the simple gut extends from the stomach to the vent. In none of these types has the cæcum been evolved. In a number of mammals a like cæcumless state exists; sometimes these cæcumless mammals are referred to as showing a reptilian type of intestine. In all other mammals the simple gut forms the small intestines and the large bowels.

As such cæcumless mammals as bears, the great ant-eater, the Tasmanian devil, and the native wild cat of Australia are all able to convert proteids, fats, and carbohydrates into mammalian tissues, it is probable that the cæcum has been evolved to meet physical changes in the food. As comparative anatomy demonstrates that the cæcum is developed only in those mammals that eat, or have eaten, vegetation; the probability that the cæcum exists to deal with the hardness which vegetation acquires through growing in our, more or less, dry atmosphere, bears something akin to an established fact. This fact is established by physiologists discovering that cellulose is digested in the cæcum.

The function of the simple gut is to absorb the products of gastro-duodenal digestion and to carry the residue of digestion to the vent. After the simple gut has been differentiated into small intestines and large bowels, the function of the small intestines is that of the simple gut, plus the carrying of cellulose-containing ingesta to the cæcum. The necessity of clearing the small intestines of bulky ingesta, so that it may carry out its proper function without hindrance, leads to hypertrophy of the musculature of the ileum. This reaches its highest development in the ileo-cæcal valve. The function of the ileo-cæcal valve is to clear, in association with the muscles of the ileum, the undigested ingesta from the small intestine, and through the tonicity—that is, the characteristic feature of involuntary muscle—to act as a valve and close the ileum against regurgitation from the cæcum.

The necessity that compelled the early mammals to roam the earth in search of food found them cæcumless. Those that continued to find food, such as the reptiles eat, have never evolved the cæcum; those that were compelled to eat vegetation evolved the large bowels; and, under some circumstances, also the paunch. Food arriving in the early mammalian stomach set up commotion in relationship to the strangeness of its physical characters. Thus, when vegetation was eaten slowly and well masticated, it was examined by the stomach; and that which was unsuitable to its purpose was cast, undigested, into the duodenum, the duodenum being even more inconvenienced than the stomach by the intrusion of ingesta that warred with its function, hurled the undigested ingesta to the jejunum, which, for the same reason, hurled the material into the ileum, where a like process occurred. The emptying of the small intestine is necessary to preserve its function, one of the most important of all digestive processes; the means by which the function of the small intestine

is preserved is the hypertrophy of the musculature of the small intestines, the cæcal end of which protrudes into the cæcum, tap-in-barrel fashion, as described by anatomists, but far more like the manner in which the neck of the uterus is pushed into the vagina.

The drive of the muscles of the small intestine ceases abruptly at the ileo-cæcal valve. The force of this drive is expended on the lax walls of the cæcum; these walls it dilates through the co-operation of sphincteration of the colon, which dams the outflow of the cæcum. Unlike the sphincter of the stomach, the pylorus, colic sphincteration is fixed to no special location; its position is determined by the amount of ingesta that it is necessary to imprison so that the body may be nourished. The position of the pylorus is fixed by the ducts of co-operating glands, the pancreas and the liver.

Not only is coarse undigested vegetation hastened through the small intestines into the cæcum, but water is likewise carried to the cæcum. Large quantities of water are necessary to the digestion of cellulose. The weight of water and vegetation pulls the simple mesentery by which the simple gut is suspended from beneath the spine into distorted shapes; it also drags the cæcum across the outlet of the ileo-cæcal valve.

The cæcum, being a differentiation of the simple gut, contains the same tissues as the small intestine; they are, from within outwards, mucous coat, circular muscular coat, longitudinal muscular coat, and peritoneum. The muscular coats of the alimentary tube are the slaves of digestive function; as needed, they become active or passive. The activity of the ileum is followed by the passive state of the cæcum, that permitted its walls to be stretched to that thinness, wherein the drive of the muscles of the cæcum can only move onward its contents with great slowness. During the digestion of cellulose that takes place in the dilated walls of the cæcum gases are generated. Intestinal gases play an important part in the evolution of the cæcum. After this organ has been formed by the force of the muscles of the ileum dammed against the walls of the cæcum by colic sphincteration, the cæcum is apt to have the arrangement of its muscular walls upset by internal pressure of ingesta and gas. As the walls of the bowel are distended by flatus, the outer muscular coat ruptures in various ways; between the rents the internal muscle, mucous coat, and ingesta are forced, and the external torn muscle is driven together to form muscular bands. When the cæcum is banded in the region of the ileo-cæcal valve and plain towards the apex, it will, if it subsequently undergoes involution, form a vermiform appendix. The vermiform appendix

is the vestige of a cæcum that was ruptured in the region of the ileo-cæcal valve and unruptured towards the apex.

In the *British Medical Journal*, December 7, 1912, Dr. Arthur Keith is reported as saying: "In bears the great bowel has undergone retrogression." There is but one thing which supports this idea, and that is that all the mammalian species have arisen from a common mammalian ancestor. In the bears there is no structural evidence of any retrogression of the large bowel having taken place. The common ancestor is supposed to have had a rudimentary cæcum that has been transmitted to all mammalian species by heredity. Both ideas are crude; before critical analysis they display no harmony with the fundamental principles of heredity or of evolution. The relationship of fixed-type to heredity and the way fixed-type is established by evolution both indicate that each of the mammalian species acquired its individuality back in the invertebrate stage. If that be so the mammals have sprung from as many sources as there are mammalian species. The anatomy of the large bowel clearly indicates that the mammalian species do not arise from a common ancestor. After a cell mass has acquired individuality it assumes animal shape according to the control of cosmic energies by which it is beset. Morphology is not something that emerges from a call to control animal shape; it is the effect of energies upon the organism that have so impressed it as to become latent in its cells, and thus they are transmitted by heredity. Heredity is nothing more than the transmission, from one generation to another, of latent energies that have been established by past activities. Biological evolution is as much a part of general evolution as heredity is part of biological evolution.

Those mammals that have undergone retrogression of the cæcum demonstrate that bears have not undergone that change; they are man, anthropoid apes, and wombats. By exactly the same kind of reasoning as that which asserts that bears have lost the cæcum it may be said that man has lost the carapace; for man and the armadillo arose from the mythical common ancestor, which had, in addition to its rudimentary cæcum, a rudimentary carapace which it transmitted to man and the armadillo.

Dr. Keith further says: "I have come to the conclusion that there is always a functional sphincter at the junction of the small intestine with the large. It is present in the amphibian bowel, the reptilian, avian, and mammalian. When the large bowel undergoes retrogression, as it has done in bears, the ileo-cæcal sphincter is the only visible structure which remains to mark the junction of the small intestine with the large." There is no sphincter at the ileo-cæcal valve, which is the junction of the

ileum with the cæcum, and therefore the junction of the small intestine with the large bowel. A sphincter in this position would destroy the function of the small intestine by damming ingesta upon its villi. No amphibian has a large bowel, neither has any reptile that has less than seven cervical vertebrae. The so-called ileo-cæcal sphincter of bears marks the junction of the absorbing and non-absorbing areas of the simple gut.

Dr. Arthur Keith introduces the ileo-cæcal sphincter after quoting John Hunter's remark: "If we could understand the use of the ileo-cæcal valve, then we should understand the uses of the cæcum." A valve is not a sphincter, and a sphincter is not a valve. The Greek word from which sphincter is derived means a clasp, a band; wherever a clasp or band is thrown round the alimentary tube a dilatation precedes it. Sphincteration and preceding dilatation are inseparable. The fact that there is not a single instance of a mammal with a dilated ileum proves conclusively that no sphincter exists at the ileo-cæcal valve. The Latin word from which valve is derived is not so clear in its application as anatomical and mechanical use has made it; a valve determines the direction in which currents shall flow; valves relieve congestion in front of them, sphincters make congestion in front of them.

John Hunter failed to understand the human cæcum because he did not know the law of vestiges; Dr. Arthur Keith has confused the action of the ileo-cæcal valve because he has failed to recognize the fact that the human ileo-cæcal valve is also vestigial. It has lost the function of driving coarse vegetation into the ileum ever since man applied fire to break up the hardness of vegetation, and more especially since man discovered how to transport the products of the world to one central market, from which they are distributed. The poor man of to-day lives on a nutritive diet that was denied a prince of a few centuries ago. The ileo-cæcal valve of man is a vestige of tissue that remains of those tissues that were built up to keep the small intestine of man free of coarse vegetation. The work imposed on the ileo-cæcal valve of the horse is so great that, with its associated muscles, it forms a tube so rigid that Major-General F. Smith believes that it shoots food direct into the colon. This view does not seem to fit the action of involuntary muscle; when in activity the terminal part of the ileum is not rigid, it is flaccid; food cannot pass through the ileum when it is rigid, for at that time its lumen is occluded. Food passes the ileo-cæcal valve much in the same way that a foetus passes through the neck of the uterus. Of all animal structures there is only one comparable with the ileo-cæcal valve, and that is the neck of the uterus. In

the pig, which is an excellent example of an omnivora, the ileo-cæcal valve is well developed and extends well into the ileum. The vestigial nature of man's cæcum is displayed by the record of bismuth meals that have, with X-rays, been observed to regurgitate from the cæcum into the ileum. The fæcal vomit of man displays the fact that his ileo-cæcal valve does not prevent cæcal contents getting into the small intestine. Although abdominal disease is much more frequent and much more fatal in the horse than in man, regurgitation from the cæcum to the ileum is never observed in the many colics that kill the horse. The little resistance which the ileo-cæcal valve of the dog offers to regurgitation is shown by the fact that, by the aid of a preliminary dose of castor oil, an enema may be sent right through the alimentary tube, entering the rectum and emerging from the mouth.

In order that vegetation may be made fit for cæcal digestion, it is necessary that it shall be ground by heavy molars or broken up by maceration in the paunch. The arrival of vegetable food in the mammalian stomach initiated pre- or post-gastric modification of the alimentary tube, according to the amount of the ingesta. John Hunter failed to understand the relationship that exists between the cæcum and the stomach; thus Keith says: "John Hunter was familiar with the fact that the cæcum was small, the colon short, and the fæces of thin consistence in carnivora, while the opposite was the case in vegetable feeding animals. Further, he recognized that animals with perfect gastric digestion, such as ruminants, had comparatively small cæca, while in others like the horse, with an imperfect gastric digestion, the cæca were large. He therefore recognized a very important fact that there could be an interchange of function between stomach and cæcum." Whether John Hunter really believed that which is written must be doubtful, for it is strange to account in any other way than the difficulty which we all experience in making our language express our meaning, for the marvellous information that bone-eating carnivora void cow-pats, and that the droppings of grass-fed cows have no splash. It is an unscientific statement that says the stomach of the horse is less perfect than that of a ruminant. The horse's stomach is much more highly developed than the stomach of any ruminant. It is quite evident that Keith has not discovered that Hunter mistook rumen, reticulum, and manyplies for stomach. It is quite true that there is a strong relationship between the function of the paunch and the cæcum; but that important interchange of function between cæcum and stomach that Keith regards as a very important fact does not exist. The evolution of the paunch

and the large bowels expresses the inability of the stomach to carry out the work that they accomplish.

The evolution of the paunch was due to timidity and stupidity. Those early mammals that became ruminants had not sense enough to avoid destroying carnivora. Harassed, they acquired the habit of eating voraciously, and after a rapid meal they sought the seclusion of their lairs. Under such circumstances the stomach is annoyed by being stuffed to the destruction of its digestive function. It vomits. The body being in need of nutriment holds on to the nutriment which the vomit contains by dilating the pre-gastric tube. The rumen holds the bulky food which the stomach is unable to retain; the reticulum holds the water that is necessary to soften the mass in the rumen; the manyplies rejects all coarseness that offers itself to the stomach. The pre-gastric digestion of ruminants breaks down the hardness of vegetation and robs the cæcum of that work. Thus it naturally follows that the cæcum of ruminants has but slight development. The thinness of the intestines of ruminants is caused by the musculature of the paunch doing the work that in other animals falls on the muscles of the intestines.

Those early mammals that had sense enough to eat slowly, presented small masses of vegetation to the stomach from time to time; these were examined for material fit for the stomach to digest and for material that it had to pass on to cæcal digestion. Coarse vegetation is promptly expelled into the duodenum, from thence along the small intestines into the cæcum. The drive of the muscles of the small intestine ceases abruptly at the ileo-cæcal valve, and its force expands the lax walls of the cæcum. As they stretch they become thinner, and as they become thinner they have less muscular strength, and as such stand ever subdued by the superior strength of the ileum.

Cæcal work is constantly marred by comparison with the double cæcum of birds. Although it is a fact that birds which eat grass show considerable development of the double cæcum, the arrangement of the musculature of the walls of the alimentary tube of birds is so widely different that it is impossible to make any direct comparisons between the cæcum of birds and mammals. In the mammalian cæcum gas is constantly present; and gas in the double cæcum of flying birds is prevented by the structure of the gut of birds. Two cæcal authorities compare the double cæcum of birds directly with the human cæcum, Dr. Keith the cæcum of the ostrich, and Professor Berry the tiny double cæcum of the pigeon. These structures are no more directly comparable with the mammalian cæcum than the cock's comb is comparable with the forelock of a horse. It is a difficult matter to compare

any vertebrate, possessing many neck bones, directly with mammals.

The digestion of cellulose requires much water. The cæcum becomes loaded with vegetation and water, and by its sheer weight distorts the mesentery by which it is suspended. Accommodation of the enormous development which the large bowel undergoes, as an animal becomes a vegetarian, is only possible after the simple mesentery has been pulled out of recognition. The shape of the cæcum itself is due to peristalsis starting at that point that becomes the apex of the cæcum, the distension of the cæcal walls by the force of the musculature associated with the ileo-cæcal valve, and sphincteration of the colon.

One of the most interesting changes in the cæcum of the horse and man is the formation of muscle-bands. These interesting structures are seen only on the stomach and the large bowel; they do not occur on the small intestine. They are very rare on the stomach, occurring as they do in kangaroos, wallabies, and one of the Indian monkeys. They are common on the large bowel of mammals. They do not occur in fish, amphibians, and reptiles with seven and less neck bones. They are due always to the same cause: rupture of the external muscular coat by the force of gases within the gut. They are of particular interest in the formation of the vermiform appendix. When the cæcum of the horse was ruptured it tore clean down to the cæcal apex; this type of tear is extremely common in the various and many mammals that have undergone this change. It is the common type of tear amongst the monkeys. Torn in this manner, it is not possible for a vermiform appendix to form at the cæcal apex should the animal return to a food that does not require cæcal digestion, and which induces involution of this organ from disuse. The cæcal tear that produces a vermiform appendix is much more rare. It occurs in a loris and in one of the lemurs; it preceded the formation of the vermiform appendix in man, anthropoid apes, and wombats, the only animals that have the vermiform appendix. In these animals the cæcum is torn only in the region of the ileo-cæcal valve, the external muscle remaining intact at and towards the apex.

The cæcum of prehistoric man was plain until gases generated by the digestion of cellulose ruptured the external coat. These rents extended about half-way down the cæcum, from thence to the apex; the external muscular coat remained undamaged. The ruptures divided the cæcum into a banded and a plain part; the latter became the appendix.

Organs that perform those functions for which they were evolved remain of fixed type; therefore, so long as primitive man

loaded his large bowel with food largely composed of cellulose, the cæcum remained of fixed type. Organs that have ceased to perform those functions for which they were evolved remain persistently in atrophic structure and become vestiges. The light nutritive diet of civilized man requires no cæcal digestion, his cæcum is atrophic from disuse, and the vermiform appendix marks the remains of the apical part of the large cæcum of ancestral man.

Organs in disuse become suppressed or suffer extinction when they are submitted to hostile activities. The banded cæcum has been suppressed in man by the pull of the muscular bands of the colon. As the contents of the cæcum grew less, these colic bands drew the cæcum in the direction of the colon and atrophy took up the slack. The muscular bands of the cæcum deliver their pull at the junction of the banded and plain parts of the cæcum. When the cæcum has shrunk to that degree wherein the diameter of the lumen sets each and all muscle bands in opposition the apical part becomes shut off, except by a narrow channel, from the wide lumen of the banded cæcum. Thus the appendix is formed.

After the formation of the appendix the mesenteric band pulled it towards the ileo-cæcal valve. Following the extinction of the lower ends of the cæcal bands by the pull of their upper parts, the upper parts are in turn suppressed by the pull of the colic bands. The terminal segment of the cæcum is never submitted to the hostile pull of the muscle bands, either cæcal or colic; the appendix, being submitted to no hostility, will persist for ever or until some hostile force may arise that shall rub out the impression of those activities which ages ago so affected the germ-plasm that the remains of a lost function is transmitted by heredity.

The history of the human cæcum is clearly written in those cæcal variations that are described as types A B C D of appendix. The remarkable fact about these types is that A is not a type of an appendix; it is a funnel-shaped cæcum, a type that precedes the appendix.

Although the older anatomists established the fact that the vermiform appendix occurs only in man, the larger apes, and the wombats, this vestige has been attached, by many writers, promiscuously on animals. Thus Keith makes the startling statement that "it has never been suggested that the appendix of the koala, wombat, rabbit, lemur, or of the anthropoid apes is a vestige." As neither the koala, the rabbit, nor the lemur has a vermiform appendix the suggestion would be absurd. The wombat has a type D vermiform appendix, which is the most vestigial of all appendi-

cular types. Many of the apes—that is, the chimpanzees, ourangs, and the gibbons have a funnel-shaped cæcum in which the appendix is not yet formed. These animals have A and B types of the appendicular cæcum, and as such represent the earliest types of this cæcal vestige, and consequently the least vestigial. A man that has a type D appendix has a more vestigial appendix than a man who has a type B appendix, and what is also of some importance, he has an appendix that the surgeon has some trouble to find. Of the animals mentioned by Keith one, the rabbit, is responsible for more confusion about the cæcum than any other animal. It has lots of lymphoid tissue at the apex of its cæcum, and also a corresponding amount in a sac about the ileo-cæcal valve. With more hurry than judgment it has been claimed that the appendix has been evolved for lymphoid tissue, therefore the end of the enormous cæcum of the rabbit has had the vermiform appendix thrust upon it.

Richard Owen said: "The slender termination of the cæcum of the hare is glandular, like the vermiform appendix of man." It is a noteworthy fact that two likenesses which the old anatomists saw have grown into one and the same thing; thus the likeness which John Hunter saw between stomach and cæcum has been followed by Ellenberger, describing the cæcum as a second stomach; and the likeness which Owen saw between the lymphoid tissue in the cæcum of the hare, whose cæcum, by the way, is identical with that of the rabbit and man's appendix, has for a long time past been transformed into a vermiform appendix. As proximal dilatation invariably goes with sphincterization, so does a cæcal fundus invariably accompany the vermiform appendix. Neither the hare nor the rabbit has a cæcal fundus.

It is claimed that the vermiform appendix is a specialization of the cæcum for lymphoid tissue. This cannot be so, because the vermiform appendix of the wombat, the most typical vermiform appendix that occurs, is practically devoid of lymphoid tissue; and the rabbit, which has no vermiform appendix, has more lymphoid tissue at its cæcal apex than any other animal. Following my work on the vermiform appendix, wherein the fallacy of the lymphoid hypothesis was exposed, and which was discussed in a sub-leader in the *British Medical Journal*, Dr. Arthur Keith is reported to have said: "Twelve years ago Professor R. J. A. Berry, on the evidence he then produced, came to the conclusion that the appendix should be regarded as a specialized part—not a retrograde part—of the cæcum, and that is the conclusion which everyone must reach who makes an impartial survey of our knowledge of the comparative anatomy and of the evolution of the human ileo-cæcal region."

It is not easy to review our knowledge, for it appears so different to the various reviewers. It is easier to review comparative anatomy and the evolution, involution, suppression and extinction of the cæcum. Professor Berry says: "The appendix is present in the opossum, rabbit, lemur, the anthropoids, and man, and whilst the vermiform appendix, as such, is only present in a few animals, I shall have occasion to show later that throughout the animal world there is a histological homologue of the appendix vermiformis of man." Sound comparative anatomy denies that either American or Australian opossums have the vermiform appendix; amongst the numerous opossums of Australia the cæcum is invariably well developed. None of the lemurs has a vermiform appendix; amongst primates they possess the highest development of the cæcum; one of the ring-tails has a cæcum showing a banded part and a plain cæcal part, and should cæcal retrogression take place in this lemur, it is certain to ultimately form a vermiform appendix. It is possible to follow the mechanism of the formation of the appendix with models constructed from this lemur's cæcum to the appendix of man.

The histological homologue, occurring throughout the animal world, of man's appendix is certainly an evasive structure. It compels us to believe that invertebrate organisms have a rudimentary vestige tucked away in invisibility. The rudiment of an organ resides in the necessity of constructing organs to perform some special function. The development of the structure occurs in proportion to the amount of the function that is done. A lot of confusion has always existed about rudimentary organs; as a matter of fact, the body shows no rudimentary organs; those that are called rudimentary are organs that have not been developed. A vestige is the remains of structure that was built up to perform a function that has ceased to be necessary. How the mind can be brought to conjure up a homologue of such a negation as a dead function passes understanding. There can be no histological homologue of a vestige, and the strength of Professor Berry's claim of a histological homologue lies in the fact that he denies that the vermiform appendix is a vestige.

Professor Berry's main contention is that "the vermiform appendix of man is represented in the vertebrate kingdom by a mass of lymphoid tissue situated most frequently at the cæcal apex." Why lymphoid tissue should require a piece of gut to be evolved for its protection is not announced; if we are asked to believe that the appendix has been evolved for lymphoid tissue, we may be excused if we make the logical, yet absurd observa-

tion, that the throat has been evolved for lymphoid tissue because it harbours the tonsils. Then, again, comparative anatomy reveals the startling fact that throughout the mammals there is less lymphoid tissue towards the apex of the cæcum than there is about the ileo-cæcal valve. In this main particular the lymphoid advocates have ignored the facts of anatomy.

Professor Berry says: "Lymphoid tissue is the characteristic feature of the true cæcal apex throughout the animal kingdom." If Dr. Arthur Keith will make that impartial survey of comparative anatomy which he says compels an endorsement of the hypothesis that the vermiform appendix is evolved for lymphoid tissue, he will discover that comparative anatomy lends it no support, and further shows it to be wholly the product of imagination uncontrolled by the comparison of animal tissues. To say the vermiform appendix has been evolved for lymphoid tissue is on a par with saying that the vestige of the coracoid bone, the coracoid process of the scapula, has been evolved for phagocytosis because the blood which passes through this vestige contains phagocytes. It is fully apparent that the lymphoid function of the vermiform appendix is not the function that evolved the unbanded portion of the large cæcum of ancestral man, the structure that has shrunk into the appendix; the lymphoid function is quite a secondary affair that has nothing to do with the question of the vestigial state of the vermiform appendix. Professor Berry further says the amount of lymphoid tissue at the cæcal apex varies, most probably, but not certainly, with the varying diet of the animal. The rabbit has by far the greatest amount of lymphoid tissue at the apex of the cæcum, its food is entirely vegetarian; it is just as probable that the large quantities of lymphoid tissue that exist in the rabbit are associated with the productivity and rapid growth of these vermin, as it is that food is the operating factor. Other herbivora are devoid of lymphoid tissue at the cæcal apex; and although much is made of the lymphoid tissue in the apex of the cæcum of the rabbit, an undue silence has been preserved about the large mass of lymphoid tissue that resides in a sac by the ileo-cæcal valve of the rabbit. For the reasons cited by Professor Berry, he further says: "The appendix of man is not, therefore, either a vestigial remnant, or an organ in a state of retrogression, but is actively functional lymph gland." It represents a new idea of a lymph gland to regard typical gut wall, as the appendix is, as component parts of a lymph gland; also there is no reason forthcoming from those who claim that the appendix has been evolved for lymphoid function for ascribing to the lymphoid tissue of the appendix a function that differs

from the lymphoid tissue of the ileum and that of the rest of the cæcum.

A study of the mammalian cæcum displays many errors that are commonly held as fact. The vermiform appendix does not necessarily depend upon a meat diet. The thing, of which it is a vestige, was evolved to digest vegetation; the animal that has the most vestigial vermiform appendix is a pure vegetarian. Wombats and koalas are closely related; they differ in that the wombats have lost the cæcum, except the vermiform appendix; and the koala have about 8 ft. of cæcum. Originally both these animals lived on gum leaves; the wombat has given up this scented wood for food and taken to vegetable food of greater nutritive value. The place of the cæcum is ill-defined and there is no doubt that the colon of the wombat still performs cæcal functions.

The ileo-cæcal valve is rightly named. It is not a sphincter as has been many times stated. It is a typical valve, although the valve action is secondary to its prime function of emptying the small intestine.

The formation of the vermiform appendix depends entirely upon the manner the external muscle tears when subjected to pressure from within. It is an easy matter to build up mechanical models that display the formation of the vermiform appendix.

Finally, there has been too much nonsense talked about the evolution of the cæcum; these processes can only be followed by the forces that built up this organ. It is profitless to discuss the matter by theories of gemmules, chromosomes, or hormones, for all these things must ever be reduced to the energies that established them in the first instance. The physical side of comparative anatomy is a much neglected subject.

Lymphoid tissue has nothing to do with the formation of the vermiform appendix. Nor has lymphoid tissue any relationship to carnivorous and herbaceous habits. I have seen a number of wombats that have died in captivity from perforation of a lymphoid patch in the ileum, but never a case of appendicitis in this animal. It is unfortunate for man that he happens to have lymphoid tissue in his appendix; it is unfortunate that the susceptibility of this lymphoid tissue to engage in septic processes has led to the denial of the vestigial nature of the appendix. The basis of the lymphoid hypothesis is that lymphoid tissue forms the apex of the mammalian cæcum. Comparative anatomy displays the fact that lymphoid tissue does not form the cæcal apex, nor is the apex of the cæcum the most common site of lymphoid tissue in the cæcum; the amount of this tissue around the ileo-cæcal valve exceeds it.

EVERSION OF THE UTERUS.

BY M. R. STEFFEN.

EVERSION of the uterus is always a very serious condition in cows. A complete eversion of the uterus presents a most discouraging spectacle, and in all veterinary practice there is no condition presenting an anatomical displacement of more formidable proportions.

There seems to be no fixed rule or combination of circumstances for the occurrence of this accident in cows. The condition has been seen in range cattle as well as in dairy cattle. One *possible* explanation of an exciting cause might be an exceptionally heavy, and at the same time, completely attached placenta which induces excessive post-partum, expulsive acts.

Aside from this I can point to no particular *direct* cause for this condition. In my experience most of these cases show eversion with the placenta firmly attached; now and then an eversion occurs in which the after-birth has come off. I can recall several cases to which I was called wherein the cow was straining abnormally, apparently in an effort to expel the secundines, which I am positive would have ultimately terminated in complete eversion of the uterus if their removal had not been promptly accomplished by manual extraction. In these cases eversion had already started; removal of the after-birth with proper flushing and swabbing immediately put an end to the trouble.

The mortality in eversion of the uterus is governed by two chief causes. One is shock; the other infection. But here again no fixed rule can be considered. Those of us who have seen many of these cases can recall deaths with the best of care and recoveries with the most outrageous handling. I recall one instance which was somewhat of a knocker to me when I first began practice. A farmer had a case of eversion of the uterus in a cow shortly before I located for practice. He "merely put it back in," hair, chaff, manure, and everything else with it. The cow recovered without missing a feed. Some time after I located in his vicinity he had another similar case, and, like a good fellow, called me. I spent ten or fifteen minutes cleaning up the mass with every antiseptic precaution and delicacy before replacing it and gave the cow every care. She died in two or three days. I remember a number of similar incidents.

However, this is no reason why we should allow ourselves to ignore scrupulous cleanliness in treating these cases. I merely mention it to show that recovery or death are not controlled by set rules. All we can reasonably say is that undoubtedly death was due to shock if the death occurred a relatively short time after the eversion took place, say, not more than ten or twelve hours. If the death occurred after a number of days the cow no doubt succumbed to infection. To attempt to prognosticate this cause of probable death is evidence of a lack of experience with these cases.

The treatment or handling of a case of this kind in a tactful, and at the same time, successful manner, requires the exercise of much good judgment on the veterinarian's part. In addition to this good judgment the veterinarian must "keep cool." Veterinarians who never use a cuss-word at other times usually "cuss" just a little when they are engaged in correcting an eversion of the uterus.

My plan of handling these cases is about as follows:—

I start with a hypodermic injection of morphine sulphate, from 4 to 6 gr. I have a twofold purpose in this morphine injection. The first is to overcome sensibility to a certain extent; the second is to counteract shock. Morphine is now considered the most scientific remedy for combating existing shock.

Having given the morphine injection, I proceed to remove the after-birth if it is still attached. When this has been accomplished an attempt is made to cleanse the organ itself. When I say "an attempt is made," I mean that I do not go to extremes in this part of the performance. I have a pail full of antiseptic solution into which I repeatedly dip the hands, slushing the contents wherever any foreign matter is seen on the parts. With a pail full of solution the cleaning can be accomplished thoroughly enough for all practical purposes. A clean sheet or rubber apron is placed under the uterus to keep it clean after the washing is completed.

Up to this point in the proceedings no difficulties of moment are encountered. Now they begin.

I make strenuous efforts to get the cow on her feet in every case after I get through cleaning up the uterus in those cases in which she is lying down. If she is standing up, of course, one is that much ahead. It is not always possible to get the cow

up, but it pays to make considerable effort to get her to arise because, if one succeeds in bringing her to her feet, the reposition of the mass is rendered fully 50 per cent. easier.

During the time that the cow is being urged to get up, and when she is in the act of getting up, the uterus must be protected from again becoming soiled. This is best done by wrapping it entirely in the sheet or rubber apron. When the standing position has been attained have the cow moved in such a way that the fore-quarters will be considerably lower than the hind. This is not absolutely essential, but it helps to make the replacement easier.

With an attendant holding the tail out of the way and another man supporting the mass in the sheet or apron, the veterinarian begins the inversion by firmly grasping around the portion closest to the vulva with both hands and forcing it firmly, yet not roughly, into the vulva. At the same time the attendant holding the pendant portion of the mass should "follow up" with it. When the veterinarian has the portion in his grasp forced into the vulvar opening he must not release his grip at once, but slowly, with a sort of "feeding in" motion, and all the time holding in place by forward pressure what he has already replaced, he grasps again with both hands. Sometimes, if the cow strains severely, only one hand at a time is changed for a new grasp. This is repeatedly gone through until enough of the mass has been pushed in so that the attendant finds he has nothing left to hold. The veterinarian now places the doubled fist of one hand in the centre of the mass still outside of the canal and by appropriate pressure completes the *inversion*, following in the full length of his arm and straightening out the "kinks" as much as possible. The pushing, during the entire process, must be done during the straining *intervals*; that is, while the cow is in the act of straining the veterinarian holds his ground. Then, just at the moment when the cow relaxes from each strain, is the time to accomplish something.

This I have found the best and safest method for inverting an everted uterus. I have tried other methods, such as have been recommended from time to time by various writers, but find this is the best.

If one fails to get the cow on her feet he is compelled to accomplish his object in a very awkward and tiresome position,

and usually, to complete the reposition properly, must lie flat. Besides, the resistance to inversion is greater in the recumbent position. In the standing position the last portion of the mass literally falls into place.

In some cases matters are expedited considerably by smearing the vulva and its surroundings thickly with vaseline.

When inversion has been accomplished nothing in the line of a retaining appliance is necessary if the cow is standing up at the time. Sfraining after reposition is usually due to "kinks," and will not occur if the cow is standing at the time of the replacement. If the cow is down at the time of replacement it is a difficult matter to properly straighten these "kinks" and straining usually occurs.

Even in the latter cases I use no retaining appliances. I make every effort to get the cow on her feet as soon as the organ is in place and then have her placed with the hindquarters raised.

Sutures through the vulva, rope trusses, and other appliances have little value. I never use them. When a cow strains after I have replaced the mass I know that there is still a portion of it being pinched by a partial inversion. If it cannot be reached with the hand and forced into normal position, the best plan is to pump the cavity full of warm antiseptic solution. The straining will stop as soon as the "kinks" straighten out.

Tonics are to be given as after-treatment, and *always* a prophylactic dose of mixed bacteria to forestall infection. The treatment of various complications or sequelæ is left to the professional judgment of the attending veterinarian.—*Amer. Journ. of Veterinary Medicine.*

Clinical.

PARTURIENT LAMINITIS TREATED WITH AUTO-GENOUS VACCINES.

By WILLIAM SCOTT, F.R.C.V.S.

Bridgwater.

LAMINITIS following upon parturition must always be looked upon as a serious condition, therefore any line of treatment adopted with the view of cutting short the disease and limiting the inroads to organic changes which are liable to follow must always form welcome material for the consideration of practitioners. We all know how unsatisfactory it is after succeeding in allaying the constitutional disturbances when the case "hangs fire" and we are confronted with grave organic changes developing within the hoof, which practically means the future working utility of the patient is in jeopardy. In those cases which run a very acute course the protective mechanism of the animal's body is so thoroughly thrown out of gear by the aggressive onslaught of the bacterial invasion that Nature seems unable to recover herself, and the patient soon dies. These cases begin primarily as an acute *auto-intoxication*, and as such may end, or they may be followed up by an *auto-infection*. In either case the protective forces are so paralysed that the natural responses to bacterial aggressivity are not forthcoming, or if at all, only in an incompetent manner, and instead of bacterial invasion acting as a stimulant the opposite condition becomes evident. This state of affairs may be due to a high degree of virulence of the causative bacteria on the one hand, or a low protective index of the patient on the other at the time of invasion. There are several factors at play in the production of parturient laminitis, but if we could obtain a completely sterile womb prior to and after parturition and until that organ merges into complete passivity, we should hear little of this condition in breeding mares.

In those cases of retained placenta a state of contractile inertia exists in the womb, and if the foal is dead born or weakly plastic adhesion exists between the womb and placenta, and I believe this latter condition is brought gradually about during pregnancy through an altered condition in the maternal blood consequent upon an attack of strangles, influenza, or similar

specific diseases. What this alteration is I am not prepared to say, but I have noticed in some of those cases there exists an abnormally high *calcium content*, and that material improvement has followed the injection and administration of decalcifying drugs. In parturient laminitis chemotherapy has pronounced limitations, for really after keeping the eliminative channels well flushed to rid the system of toxins and the irrigation of the womb, the fountain of source of these toxins, we can do but little more. These, however, are very important tenets, which brook no neglect on our part. Vaccine therapy offers seductive prospects, if adopted early, for the following reasons: (1) The causative organisms can be easily obtained from the womb without the risk of alien introduction. (2) The womb being a highly vascular organ, the immune bodies, after elaboration consequent upon vaccine stimulation soon reach the focus of infection. (3) The accessibility of the womb places us in a position that we can stimulate the osmotic flow of immune serum through the uterine walls. This can be brought about by the injection of fluids several degrees higher than the present body temperature, dissolved in which are lymphagogues, such as sodium citrate or even common salt. Whether we confine our energies to the use of vaccine therapy or chemotherapy, the primary object we must always have in view is to conserve the animal powers of resistance and to reduce the subsequent risk of organic changes developing within the hoof. Vaccine therapy, if adopted early, holds out the best prospect of success in these cases.

Case 1.—A seven-year-old mare with a bad previous history. As a foal she had joint evil. At 3 years old she aborted after a sharp attack of strangles. At 4 years she developed rheumatoid arthritis, elbow, shoulder and knee, eventually making a good recovery. At 5 years she had a foal which died when a week old from joint evil—a significant fact. Some months later she developed canker in all four feet, and after being cured from this she was put to the stud. In due course she was delivered up to date of a dead foal, *post-mortem* examination of which revealed extensive blood changes. The placenta was retained for six hours and then cast, the left horn of which looked very unhealthy, the right healthy. The mare was in good condition, feeding, temperature normal, &c. Twenty-four hours later her temperature went up to 105° F. She began to blow and walk

very stiffly. The same evening marked symptoms of acute laminitis had set in. At this stage a sterile tube was taken into the womb as far forward as the hand would reach and some materies morbi collected, taking care that during the process of withdrawal no alien bacterial contamination took place. On the following morning the patient was much worse, her temperature registered 106° F., appetite in abeyance, profuse perspiration, blowing heavily, and was made to move with the greatest difficulty. In the meantime I obtained a pure culture, the organism being a Gram-negative micrococcus, morphologically resembling the *M. catarrhalis* in man, and similar to the one I have isolated in certain cases of nasal catarrh in horses and mules.

From this culture a bacterial vaccine was made, slightly attenuated by heating for thirty minutes at a temperature of 40° C. Two cubic centimetres of this vaccine was injected in the neck containing 1,000,000,000 bacteria. Twenty-eight hours later the temperature was registered at 103·3° F., respiration 24 and pulse 79 per minute. The patient had drunk a fair amount of barley water, had eaten some grass and a little bran, but was made to move with difficulty. Forty-eight hours after the first injection was given another was injected, the 2 c.c. containing 2,000,000,000 bacteria suspended in a saline emulsion containing 3 per cent. trikresol. The following day the patient was walking much better, her temperature was 102·3° F., respiration normal when standing quiet, and pulse 60 per minute. Forty-eight hours later a third injection was given, the antigen this time being 2,000,000,000 live bacteria suspended in sterile saline solution. In thirty-six hours the patient was still improving, although the temperature registered 103° F. and the pulse 65. Great improvement was noticed in the walking; in fact, after a few yards the mare walked nearly normal.

From this date the mare made an uneventful recovery. Abscesses formed at the seat of the last two injections, but which were of no account.

Some time later this mare died from acute pneumonia. *Post-mortem* revealed, in addition to the lung affection, concentric hypertrophy of the heart and an old-standing atrophic condition of the liver, which was studded with numerous old abscess cysts. It was the smallest liver I have ever seen, and was only a few pounds in weight.

Case 2.—A ten-year-old cart mare with retained afterbirth ten hours, removed carefully; took materies from the womb and irrigated the organ. The mare went slightly stiff, her temperature was 104° F., respiration hurried, membranes injected and icteric, womb very flabby and containing a large quantum of tenacious reddish-grey material.

The causative organisms were *Bacillus coli communis* and *Streptococcus brevis*. The latter was grown with difficulty and only on blood agar. Further, the former were in great abundance in the materies compared with the latter, the ratio being about 15 to 1. An alternative vaccine was injected; the emulsion was heated for forty-five minutes at 30° C., the dose being 4 c.c., containing 1,000,000,000 streptococci and 1,500,000,000 *B. coli*.

The following day the mare was about the same. The seat of inoculation was swollen and painful.

Sixty hours after the first injection the patient was given another dose of vaccine, the strength being 1,000,000,000 streptococci and 2,000,000,000 *B. coli* suspended in 4 c.c. of normal saline solution.

Two days later the patient was walking much better, the temperature normal, appetite moderately good. From this date progress was steady, no further injections being given. Abscesses formed at the seats of injection. These were lanced, healing taking place slowly.

Case 3.—A hunter brood mare gave birth to a dead foal; placenta retained twelve hours, the temperature 104.4° F., respiration 32 per minute, pulse 73 per minute; could scarcely move.

Diagnosis: Acute laminitis. Causative organisms: Streptococci and *B. coli communis*.

A stock vaccine of *Streptococcus with coli* was injected forthwith: 500,000,000 streptococci, 1,000,000,000 *B. coli*, held in suspension in a 5 per cent. trikresol solution. Forty-eight hours later an autogenous vaccine was administered: 100,000,000 streptococci, 1,500,000,000 *B. coli*, held in suspension in normal saline solution. Thirty-six hours later the patient was greatly improved, although she was very stiff. From this date both hocks began to swell, simulating rheumatoid arthritis, and entirely masking the foot lameness. She appeared to walk much better, however, on her fore feet.

The following day her temperature went up to 104.3° F., and she was in evident pain. Fifty cubic centimetres of anti-streptococcus serum was injected, to which I added sodium oleate and acid boric. The following day the temperature had gone down 3°, the patient walked much better, began to flex the hocks, which were not so painful, although just as much swollen. I now injected a pure virulent emulsion of streptococci 1,000,000,000 with *B. coli* 1,000,000,000. A small abscess formed at the seat of the second inoculation, but none at the third—a rather significant point, probably due to the bacteriotropic condition set up by the serum.

The hocks were blistered, and although slightly enlarged, the normal articular movements returned in due course.

General Treatment.—The bowels were unloaded at the outset, the kidneys and skin flushed by the exhibition of turpentine and salicylic acid, the womb irrigated with hot water—the temperature being several degrees higher than the patient's registration—and dissolved in which were acid citric, acid boric, and sodium chloride.

In *Case No. 1.*—Poultices and slings were used, also uterine pessaries and normal saline injections.

In *Cases Nos. 2 and 3.*—No poultices, slings, or pessaries.

Observation.—Upon the results obtained in only three cases it is impossible to dogmatize, but from experience gained on the value of vaccines in other uterine cases and the agreeable way many cases respond to the vaccine stimulus, I venture to think a good prospective lies ahead of the vaccine therapist in this particular fluid. To obtain the maximum benefits the causative bacteria must be isolated, and the treatment must be carried out early; failing this, grave alterations take place in the blood serum, followed by effusion from the small capillaries, blood-vessels of the feet, and the deposit of lymph between the hoof and pedal bone, which is liable to end in structural disorganization and other sequelæ well known to the practitioner. It will be noted I have used for my vaccines living bacteria in those cases and in other selected cases, both as prophylactic and curative vaccines. I have been using them for fully a year. From these I have obtained no harmful results save local abscesses at the seat of inoculation, and the antigens thus prepared exercise more pronounced activating properties over the immunizing mechanism than when they are subject to heat or powerful antiseptics.

Canine Clinicals.

A CASE OF PERFORATION OF THE AORTA BY *SPIROPTERA SANGUINOLENTA* IN A HOUND.

By T. S. TIRUMURTI, M.B. & C.M.

Assistant Professor of Pathology, Medical College, Madras.

"DAMSEL." Suddenly she was off colour on March 6, 1914, and died the same night. She was one of the pack of Madras Hounds. At the request of Major T. H. Symmons, I.M.S., I did a *post-mortem* examination on her to find out the cause of her sudden death. The examination was conducted the next morning at 10 a.m.

The animal was well nourished. *Rigor mortis* was present, and there was no *post-mortem* staining. Nothing abnormal was noticed on opening the abdomen, except that the organs were paler than normal and the diaphragm was depressed below its usual height on both sides. On opening into the thorax both pleural cavities were found filled with a large amount of dark-red blood, and the lungs collapsed. The mediastinum was distended with infiltrated blood, and the parietal layer of the pleura, which formed the lateral wall of the mediastinum, was ruptured on both sides from the level of the sixth to the eighth dorsal vertebræ. Clot and liquid blood were seen through the rent. A firm nodule was felt at the lower end of the œsophagus.

The pericardium contained a small amount of clear serous fluid. The heart was normal in size, and its cavities, valves, and orifices were normal. The lungs were collapsed, otherwise nothing abnormal was seen in them. After the removal of the heart and lungs, the contents of the posterior mediastinum were removed entire.

Attached to the anterior wall of the lower end of the œsophagus was an ovoid tumour about the size of a walnut. On section this tumour was found to be of a fibrous nature. Small cavities were seen in the meshes of the fibrous tissue containing numerous reddish worms coiled up together. At one point the mucous membrane showed a minute perforation. Here the parasites were close beneath the mucous membrane. The muscular coats of the œsophagus extended over the surface of the mass, so that most of the fibrous tissue formation had taken place round the worms deep to the muscular coat. It appeared

as though the worms were in an active condition of migration. One of them was seen to penetrate the anterior portion of the

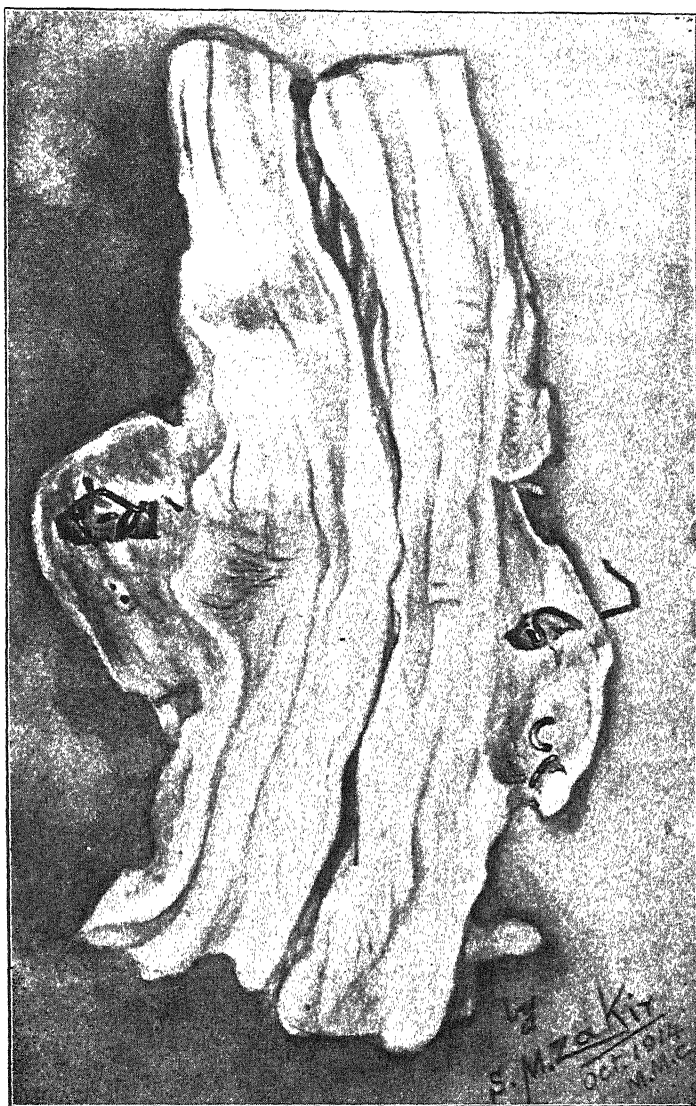


FIG. 1.—Showing the worm penetrating the anterior portion of the tumour.

tumour (fig. 1). The perforation in the mucous membrane of the œsophagus appears to be the result of similar activity.

On opening into the thoracic aorta the inner coat of the vessel was found thickened, dark in colour, and at one point perforated. Some clot was present round the perforation. On its removal a portion of a reddish worm became evident lying in the opening (fig. 2). A portion of another was seen to the right lying below the inner coat, which was removed. Behind the perforation was the fibrous verminous nodule of the œsophagus described above.



FIG. 2.—Showing another view of the worm *in situ*.

All the other organs were normal. Some of the worms were removed for purposes of identification. The worm was reddish in colour and from 3 to 5 cm. long, and accorded in its anatomical details with the description of *Spiroptera sanguinolenta* (Rud.) by Neumann.

This parasite is said to be common in China, Brazil, and Italy. I am told that many cases of this parasitic infection occur but are

not reported from India. Lewis, at Calcutta, has frequently seen in dogs nodules in the aorta resulting from *S. sanguinolenta*, which he called *Filaria sanguinolenta*. Megnin, Chauvrat, Perroncito, and Caparini are said to have witnessed dogs dying suddenly from hæmorrhage owing to rupture of the artery, the walls of which had undergone atheromatous degeneration. The rarity of such a complication and the absence of reports of many such cases, at least from this part of India, have induced me to record this interesting case.

My thanks are due to Captain R. E. Wright, I.M.S., for permission to report the case, and to Mr. S. M. Zakir, artist, Madras Medical College, for the plates, which he kindly painted for me from the specimens preserved in the college museum.

A CASE OF PRIMARY MALIGNANT DISEASE OF THE LIVER IN A HOUND WITH SECONDARY VISCERAL DEPOSITS.

By T. S. TIRUMURTI, M.B., C.M.

Assistant Professor of Pathology, Medical College, Madras.

“TRINKET.” *Clinical History.*—The liver and spleen were enlarged. She was off her food. The blood examination was negative. The lungs were normal. Half the usual dose of neo-salvarsan was injected, as the animal was suspected to be suffering from piroplasmosis. The reaction was slight. The evening temperature on the day of injection rose to 102.2° F. She became very thin and anæmic. Costal spaces were retracting. She showed signs of respiratory trouble in the end, and died eleven days after the injection of neo-salvarsan. There was no nasal discharge.

The *post-mortem* examination was conducted by me at the request of Major T. H. Symmons, I.M.S. The animal was poorly nourished. *Rigor mortis* had passed off. The muscles were pale. The peritoneal cavity contained a large amount of clear blood-stained fluid. The liver was enlarged and showed numerous raised growths. On opening the thorax both pleural cavities contained a large amount of clear blood-stained fluid. Pericardium contained a small quantity of clear serous fluid.

Heart was normal in size. Its valves and orifices were normal. The heart muscle was a pale brown colour and firm in

consistence. The lungs were pale, but slightly moist on section, and firm and elastic in consistence. There were no areas of consolidation. Crepitations were felt throughout. A few small whitish, subpleural, secondary deposits were seen under the parietal pleura on the right side.

The spleen was only slightly enlarged, soft and flabby, and showed numerous raised whitish deposits ranging from a pin's head to a pea.

The liver was enormously enlarged and showed *post-mortem* decomposition changes. Disseminated over the surface of all the lobes numerous raised whitish deposits ranging from the size of a pea to the diameter of half a rupee were seen. These nodules were firm in consistency, and whitish in colour on section. The liver substance was greenish and yellowish in colour, and soft and friable in consistency. Larger growths were seen in the substance of the liver.

The kidneys were normal in size and moist on section. The cortex was reddish in colour and normal in extent. The medulla was pale. The capsule was thin, stripped easily, and left a smooth surface. A secondary deposit about the size of a pea was seen adherent to the outer aspect of the capsule on the anterior surface of the left kidney.

The intestines showed no growth, and no sub-peritoneal secondary deposits were seen over them.

The uterus and appendages were normal.

The lymphatic glands in the gastro-hepatic omentum, at the head of the pancreas, in the mesentery, and in front of the vertebral column were enlarged, firm, and infiltrated with growth. The omentum showed small deposits in it. The lymphatic glands in the anterior and posterior mediastinum were enlarged, firm, and infiltrated.

The death was due to primary malignant disease of the liver with metastasis.

Report on the microscopical examination of the growths: A considerable degree of *post-mortem* decomposition has taken place and spoiled the finer details. The growth is composed of cells, which are mostly oval or rounded, many resembling large myelocytes. These are generally arranged in masses in the spaces of a fibrous stroma in which some small groups also occur. All the growths are quite similar, excepting that of the

gland of the gastro-hepatic omentum. Much more fibrosis is seen here, and the spaces are much smaller. The cells, too, are smaller, and have nuclei which nearly completely fill them. The lining cells of the lymphatics in the fibrous tissue have large nuclei, which stain heavily, and the malignant cells are seen to form channels in some places. The appearances are suggestive of endothelioma.

As primary malignant disease of the liver is a very rare disease, not only in man but also in animals, the notes of this case may prove of interest.

FRACTURE OF THE ATLAS IN A TOY POM.

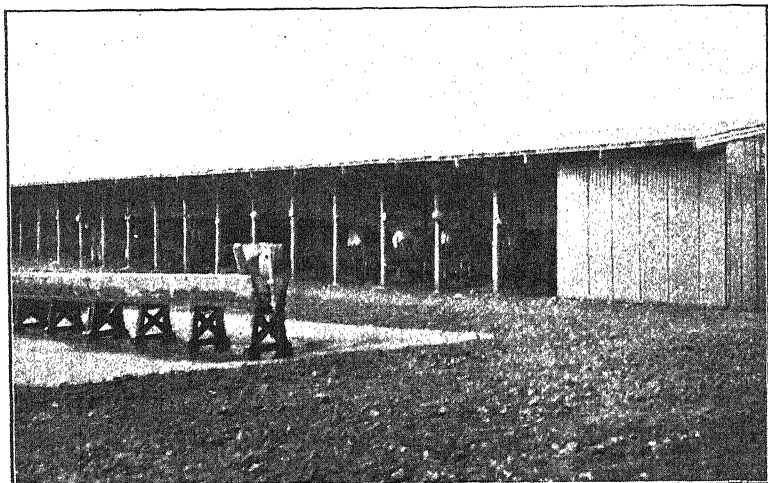
By GUY SUTTON, F.R.C.V.S.

Kensington.

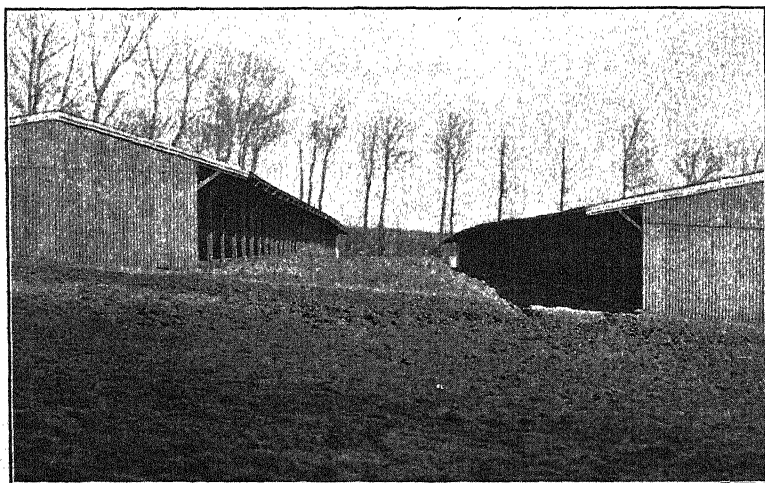
A POM was attacked by a bull terrier, seized by the back of the neck, and violently shaken. Within a few seconds the terrier was driven off and his victim rescued. Paralysis was almost complete and continued for forty-eight hours. Consciousness was now regained and the animal endeavoured to raise her head, but completely failed, and only succeeded in moving the lower jaw and screaming. When an attempt to forcibly raise the head was made the movement produced a convulsion and unconsciousness. A radiograph was taken three days after the accident, and showed a fracture of the atlas fairly distinctly. There was little precedent to help in forming a prognosis, but realizing the marvellous recoveries which Nature brings about, if not unduly handicapped by treatment, the whole circumstances of the case were explained to the owner. Absolute quiet and rest were stipulated for. Feeding was with liquids. The patient lay on a pad of Gamgee. An enema was given every third day, and the bitch discharged her urine once every twelve hours. At the end of three weeks she was able to raise her head and get up on her chest. The paralysis gradually subsided, and now after ten months the only sign of injury is pain when the muzzle is brought towards the chest.

ORIGINAL VIEWS OF ARMY VETERINARY CAMPS
WITH THE EXPEDITIONARY FORCE IN FRANCE.

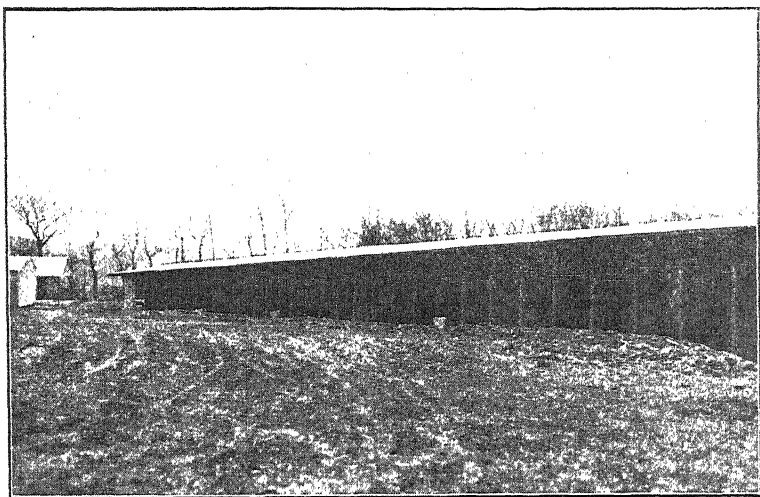
For the right to publish the following original and interesting photographic views of the work of the Army Veterinary Corps in France, and for those which appeared in our last issue on pages 335, 336, 337, and 338, we are indebted to Mr. George Monckton and to the proprietors of the *Illustrated London News*.



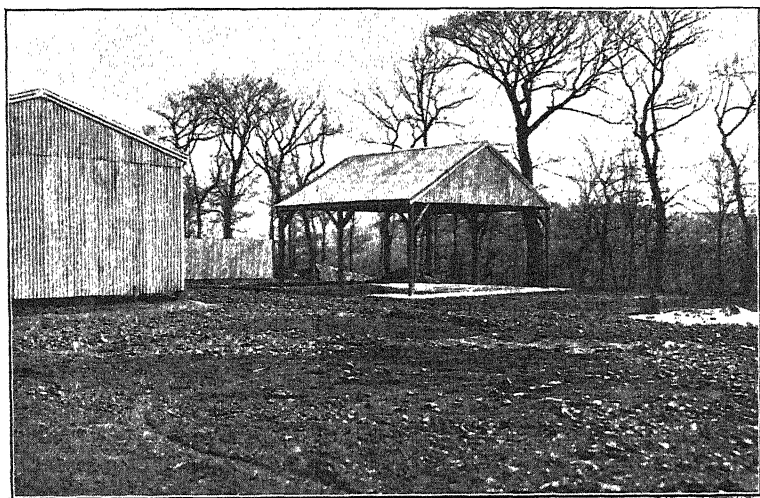
A.V.C. Veterinary Hospital—The Mules' Quarter, showing forage stores and water trough, constructed on concrete-drained base, with automatic water supply.



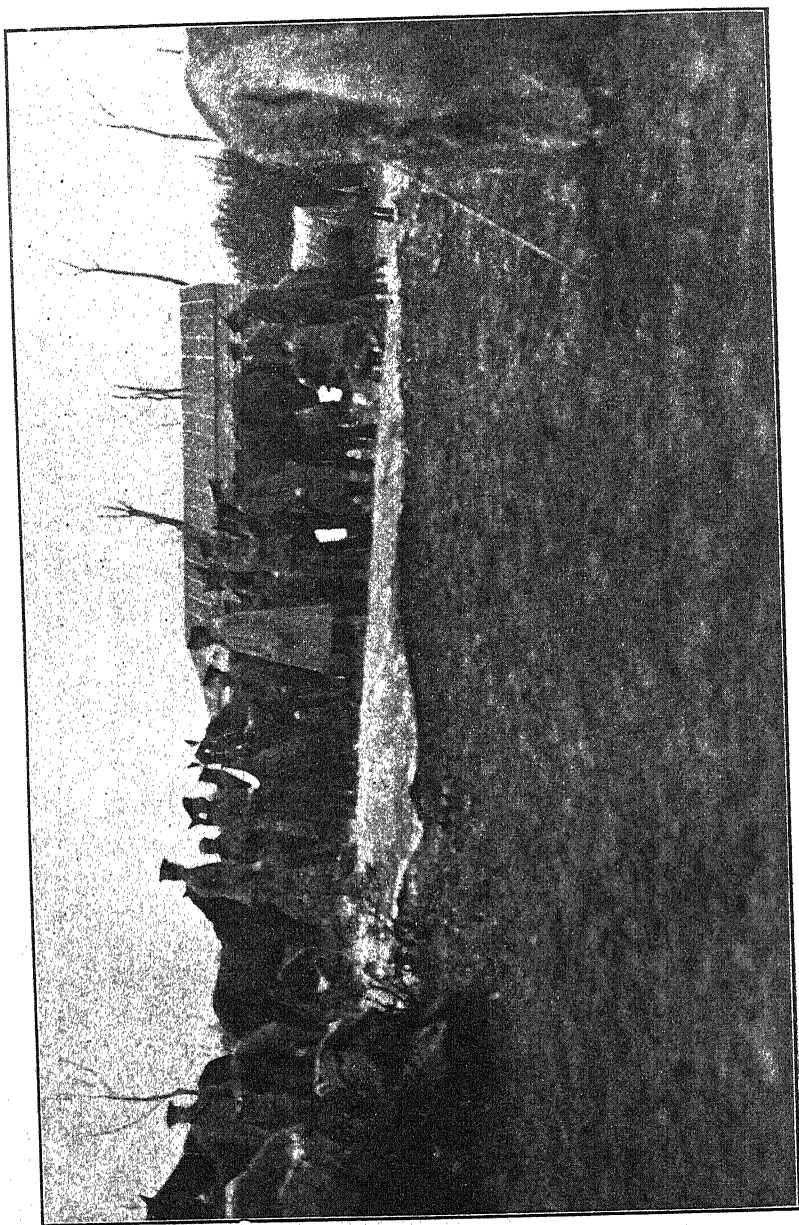
A.V.C. Veterinary Hospital.—One of the Isolation Wards for horses suffering from skin disease.



A.V.C. Veterinary Hospital.—Avenue of stalls for convalescents.



A.V.C. Veterinary Hospital.—Operating shed and pharmacy (on the left).



DIARY OF A VETERINARY OFFICER WITH A BRIGADE
OF ROYAL FIELD ARTILLERY.

August 18, 1914.—Left Bordon with Headquarters Staff at 4 a.m. Left Southampton at 7.15 p.m.

August 19, 1914.—Arrived in France 7.30 a.m. with Headquarters (38 horses), —th Battery (98 horses), —th Battery (176 horses), Brigade Ammunition Column (200 horses). Rested at docks till 3.30 p.m. Went to No. 1 Rest Camp. Saw part of town. Bully-beef for all meals. Few casualties, and slight.

August 20, 1914.—Left — Camp with Headquarters and —th Battery at 10.30 for station. Had to destroy horse of S.I.H., ruptured stomach.

August 21, 1914.—Left — at 3.30. Great weather. Two casualties (slight). With Headquarters and —th Battery. Arrived Le N— 9 p.m. Billed in pub.

August 22, 1914.—Left Le N— at 8 a.m. and marched to St. A—, arriving at 2 p.m. Orders received at 5.30 p.m. to proceed at once. Heard guns. Marched at 6 p.m. to —.

August 23, 1914.—Arriving at 1.30 a.m. Lost one horse (dropped dead), and one left at farm between St. A— and M— for laminitis. Slept in open. Limbered up and cleared for action at 4 a.m. Guns moved off at 6 a.m. to cover. Left camp at V.S.N. at 10.45 a.m. Heavy firing all day. Arrived at farm on right side of road at 11.45. Rested. Saw foreign aeroplane. Brigade wheeled into action $1\frac{1}{2}$ miles away, but did not open fire. Picketed out.

August 24, 1914.—Started at 3 a.m. with whole brigade. Not in action. Left 8 a.m. for G—. Several aeroplanes fired on. Heavy firing about one mile away. Retired from G— to N— M—.

August 25, 1914.—Left at 5.30. Arrived in Le G— F— 2.30. Rested there. Fired on by German Uhlan patrol at this place 6.30 p.m. First time under fire. Patrol got away uninjured. Stayed night here.

August 26, 1914.—Left at 4.30 for F—. Then to O—, arriving 8.30 p.m. Bivouacked there. Destroyed H.A. No. B2 Headquarters. Fractured off-hind fetlock. Very wet night.

August 27, 1914.—Left O— at 10 a.m. and marched to G—. Short delay. Very wet. Marched on to B— and bivouacked there.

August 28, 1914.—Left B—— at 5.30 a.m. Came into action here 2 p.m. Routed enemy. Then marched to and bivouacked at B—— 8 p.m.

August 29, 1914.—Rested all day.

August 30, 1914.—Left B—— at 5.15 a.m., and passed through St. G——, then to Prémontrè Asylum. Got bread, wine, and chocolates from the nuns. Rested for an hour. Marched on to B—— 3.30 p.m.; had to shoot mare (worn out). Billeted in B——. Did all my horses.

August 31, 1914.—Started at 5.15 a.m. Feeling better. Marched through C—— to S——. Got some bread, chocolates, and matches. Rested here. Went on to M——.

September 1, 1914.—Left M—— at 4.30 a.m. for F—— (4.30 p.m.). Remained there for rest of day. Got letter, tobacco, and helmet from home; got left behind, dressing case. Had a very long walk to catch up. Feeling very mucky.

September 2, 1914.—Left F—— 1.30 a.m., and marched all day till 3.30 p.m. into B——, and bivouacked there. Major B—— went to hospital.

September 3, 1914.—Left B—— at 3 a.m. and marched to La F—— (12 noon). Long delay there. In action. Saw 2nd Division. Left La F—— at 3.30 p.m., and went on to Chateau de P—— (5 p.m.), and bivouacked there. Shot three horses 54th Battery, one horse Ammunition Column, and one —th Battery. Very warm day.

September 4, 1914.—Left Chateau de P—— at 5 a.m., and marched to C—— (10 a.m.). Rested here till 5.30 p.m., then marched through M—— to —— (9.30). Rather cold and windy. Destroyed two (2) horses (one of —st Battery and one of Ammunition Column on the march), also B12 of Brigade Headquarters. Heavy firing all day by 1st Division. Got all my horses shod.

September 5, 1914.—Started at 5.30 a.m. Had to destroy C——'s charger; fracture of near hind tibia; caught in gun wheel. Marched through M——, Z——, E——, and bivouacked at R——. Had dinner in convent (Bon Secours). Sent in weekly reports to A.D.V.S.

September 6, 1914.—Destroyed Br. M. (—th Battery). Sent four horses (three —st Battery, one Ammunition Column) to K—— (Mobile Section). Left R—— at 7.30 a.m., and marched

all day (with long stops). Got in at 8.30 p.m., very fed up, to V—.

September 7, 1914.—Left V— at 5 a.m., and took up position about two miles south and stayed till 2 p.m., and then went on to —, arriving at 5 p.m., and later bivouacked at — 8 p.m.

September 8, 1914.—Left — at 6 a.m., and marched to S—. Got left, and was fired on in wood close by. Went on to H— and had tea and met Brigade. Shot two wounded German horses. Bivouacked at B— C—. Very wet.

September 9, 1914.—Left B— C— at 5.45 a.m. and marched to T—. Bivouacked there.

September 10, 1914.—Left T— at 8.45. Marched till about 2 p.m., and then went into action, all three batteries. Did good work on German column. About 300 killed and wounded of one of our regiments. Moved off again at 5.30 p.m., and bivouacked at S—.

September 11, 1914.—Left S— at 5.30 a.m., and marched to V—F—, arriving at 12 noon. Very wet day. Bivouacked here. Did all batteries.

September 12, 1914.—Left at 5 a.m. Wet day. Marched to B—, and saw thirty French and ten German soldiers dead and wounded about one mile out. Went on to V— and bivouacked there. Good bivouac.

September 13, 1914.—Wet morning. Réveillé at 5 a.m., and left at 10.30 a.m. Horse (B.G.) —th Battery destroyed (paralysis and necrosis of lumbar vertebræ). Rested on road for two hours and then went on to B—, and bivouacked there 7.30 p.m. Dull day.

September 14, 1914.—Left at 6.30 a.m., and marched on to V—, Aisne. Big scrap there, and some heavy losses to Germans. Our Brigade in action, and —th did good work. Remained in V— till 7 p.m., and then went on halfway between V— and C—. Infantry lost a fair few. Both wheelers of our cook's wagon hit by bullets. One died later of internal hæmorrhage (hit over heart).

September 15, 1914.—Still in same place. Heavy firing all day by both sides. Did well. —th Battery lost some men killed and wounded (helped to dress latter). Our batteries in action. Wet day. "Little Willie" very busy, and caused most damage. Out

at night with Robinson looking for wounded. Billeted in farm close by. Saw about sixty German prisoners.

September 16, 1914.—Still in same place and firing going on. Wet morning. One horse of —th Battery killed in action. Heavy guns (G.) firing all day; very little damage done. Bivouacked in same place.

September 17, 1914.—Wet day. Dressed number of cases of —th Battery (25th Brigade). Usual firing. Awfully wet. Good supper and good sleep. "Little Willie" pretty thick.

September 18, 1914.—Fine day. —th Battery seven horses killed in action. Shot, 2; died, 2; wounded, 11. Some men hit also. —th Battery: 3 killed, 9 wounded. Brigade Headquarters: My charger ("Paddy") wounded in neck.

September 19, 1914.—Guns started early. Awfully busy dressing cases till 3 p.m. Brigade Staff had to leave road about 3 p.m.—absolutely shelled out of it; then went to the farm, and shelling was awful there. No one could stir. At last, about 4.30 p.m., the end came. A shell from "Little Willie" (90 pounder) plunked through the barn roof, hitting Mr. A—, Regimental Sergeant-Major of the —th Brigade, the farrier of the —th Battery, Driver C—, Corporal V— (the French interpreter), and killing Gunner G— (cook) and two men of the —th Battery, also Bombardier W— and another, and wounding several more. The only ones to escape were Captain T. H. R—, R.A.M.C., and Sergeant S— (French interpreter).

My impression of it:—

A blinding flash of light, an appalling crash, then a dull pain in both knees, as if a heavy body had fallen on them, and then I felt the blood flowing from my cap. All was confusion and pitchy darkness for about three minutes. Some tried to rush out, but I quietened them by saying that I, too, had been hit, but wait till the dust cleared. Then I crawled out next door, sat down on the straw, and smoked a cigarette.

I had to dress my own wounds, one on top of crown of head (slight), one above left knee (slight), one above right knee (serious). I never felt faint or lost my head.

When the thing happened I was lying stretched in the straw, fagged out, smoking a cigarette. In about one and a half hours we were taken in ambulance to V— (suffered agony all the

way), and there dressed. Had to get a lot of morphia from the medical officer. Had to have right field boot cut off. Hospital people very kind. One Battery lost heavily in horses: 9 killed, 1 died, 1 destroyed, 15 wounded.

September 20, 21, 1914.—Very well treated in hospital. Leg not so sore. Sent things to A.D.V.S. Down in dungeon all day for protection against shells. Left for V— Hospital about 12 midnight in horse ambulance. Torture all the way. Got there 1.30 a.m. Had to get more morphia to sleep (still in stretcher). Wounds dressed again. Left here at 8.30 a.m. in comfortable motor lorry, and arrived about 2 p.m. at rail-head station, Braisne, and remained at clearing hospital until about 8.30 p.m., then put on train, but did not start till about 12.30 a.m.

September 22, 1914.—All day in the wagon. Jolting pretty bad. Terrible cramps in back and abdomen and stomach muscles. No cure to be got. Couldn't eat anything. Fairly good night.

September 23, 1914.—Still on the train. Saw a lot of troops and horses going to Front from base. Jolting still very bad. Had fair sleep and some champagne. Too tired to note down stations we passed through.

September 24, 1914.—Got to E— at 4.30 a.m. Never slept a wink night or day. Got to St. Nazaire at 6.30 a.m. Got pipe from French soldier. Put in Australian motor ambulance and taken to Australian hospital at St. Nazaire and had wounds dressed. Undressed and put to bed here. X-rayed about 12 noon, and splinters of shell seen in both legs. Back to bed, no food, and left there 6.30 p.m.; then operated on and shells removed. Suffered torture all night through dressers putting splint too tight on right leg to stretch tendons under knee.

September 25, 1914.—My birthday (26 years old). Leg relieved in morning. Good wash and breakfast. Posted letter home and doctor's letters. Smoked and read most of day. Nice dinner. Got orderly to buy me penknife.

September 26, 1914.—Still glorious weather. Fairly good night's sleep. Wounds looking well. Slept most of the afternoon. Had champagne for dinner. Got shaved by French barber.

September 27, 1914.—Good night's rest. Got X-ray photo of leg from Major T—. Got head washed. Nothing new.

September 28, 1914.—Fair night's sleep. Wounds dressed by

Captain S——. Taken on board the *Asturias* at 11 a.m. Lunch at 2.15. Bottle of stout (4d.). Very warm on the boat. Not to sail till to-morrow. Had good dinner at 7.30 (w. and s.). Plenty of old magazines to read.

September 29, 1914.—Good night. Splendid breakfast. Sailed at 11 a.m. Had legs dressed by Dr. McL—— (Scotch, and a good sort). Good dinner.

September 30, 1914.—Good night's sleep. Things same as yesterday. Had a shave. Passage still perfectly smooth. Could not land; stayed in harbour all night.

October 1, 1914.—Good night's rest. Left the boat at 12 noon and put in train. Left in train at 12.30 p.m. Got to London (Waterloo) at 2.30 p.m. Very comfortable train. Taken in motor ambulance to King Edward VII Hospital for Officers. Visited and spoken to by the King and Queen. Posted letters. Legs dressed. Splendid grub.

October 2, 1914.—Good night. Taken to Weymouth Street in motor to be X-rayed. Found another piece of shell in left leg.

October 3, 1914.—No breakfast; no lunch. Operated on at 10 a.m. Willie came to see me at 3.30 p.m. and stayed till 5 p.m., then had tea. Legs fairly comfortable. Awfully sleepy. Splint taken off.

October 4, 1914.—Quiet day. No sleep during day. Legs not dressed. Read most of day.

October 5, 1914.—Fair night. Leg very stiff all the morning. Very few visitors.

October 6, 1914.—Good night. Leg not painful.

October 7, 1914.—Fairly good night. Letters, &c., from home.

October 8, 1914.—Fairly good night. Had wounds dressed. Left leg looking A1. Discharge from shell wound in right leg. Had visit from Professor Mettam.

October 9, 1914.—Good night. Went for motor drive with Ford (Welsh Regiment) from 11 to 1 o'clock. Sent pipe to Robinson.

October 10, 1914.—Only fair night, leg uncomfortable. Nearly had row with night nurse. Said I swore at her when she woke me up. Went for motor run with Ford (Welsh Regiment). General Pringle came to see me.

October 11, 1914.—Good night. Went for motor run with Earl (R.F.A. 8th Brigade—lost left eye and broken left arm).

October 12, 1914.—Very good night. Legs dressed. New treatment (Bier's constriction hyperæmic) to be tried on right leg.

October 13, 1914.—Good night. No visitors. Had leg cauterized. Wet—could not go out.

October 14, 1914.—Good night. Tried Bier's treatment. Sitting up in chair from 3 to 5 p.m.

October 15, 1914.—Good night. Could not go out. Got up at 11 o'clock and went into sitting-room. Went out after lunch in Ralli's motor for a run with Swifte (Connaughts). Went to bed at 6.30.

October 16, 1914.—Good night. Went by myself in the motor. Up all day

October 19, 1914.—Started massage. Out after lunch in carriage. No visitors.

October 21, 1914.—Out for run with Lieutenant Grindley. Stopped fomentations. Started on crutches (not so bad).

October 22, 1914.—Good night. Crutches going strong. Moved to back ward. Wet. Not out.

October 23, 1914.—Had my first bath since the accident. Out for motor run with Mrs. Lane in her car. Two new patients.

October 24, 1914.—Fine. Out for run. Got stick.

October 26, 1914.—Sent to Lady Waterlow's, 29, Chesham Place, S.W.

October 27, 1914.—Good night. Leg dressed. Out twice in motor. Good day.

October 28, 1914.—Went to Coliseum. Good day.

October 29, 1914.—Went to see Belgian refugees.

October 31, 1914. Hippodrome, Monico, &c. Good day.

November 6, 1914.—Medical Board at War Office. Given permission to go home.

November 11, 1914.—Left London for home on sick furlough.

Abstract.

CEYLON: REPORT OF THE GOVERNMENT VETERINARY SURGEON FOR 1914.

INFECTIOUS DISEASES.

Horses.—No outbreak of disease amongst horses occurred.

Cattle: Rinderpest.—Outbreaks of this disease occurred in all the Provinces except the Southern and North-Central. All were suppressed without serious loss. Figures are given in the statements annexed. On comparing the number of cases with the total number of cattle in the Provinces it will be seen that the extent of infection was small. Separate figures are given showing cases in Colombo town and at the quarantine station.

Foot-and-mouth Disease.—This disease prevailed all over the island.

Anthrax, Hæmorrhagic Septicæmia, and Surra.—The cases of these diseases are insignificant, excluding anthrax cases at the quarantine station, Colombo, three large shipments of sheep and goats being found infected on arrival from India, of which many died.

The total number of cattle for the whole island is 1,555,732, and the number of deaths from all causes is 23,939, giving a percentage of 1.54.

The veterinary officer in charge reports that 482 cases of foot-and-mouth disease and 9 cases of anthrax were detected in the station during the year.

Remarks of Superintendent, Civil Veterinary Department, Madras, who supervises the station:—

“The year from the point of view of disease has been a bad one, and, unfortunately, this coincided with the removal of the depôt to a new site. This was naturally attributed to being the cause of the trouble by the dealers opposed to the move, but I consider it only a coincidence, and in any case efficient quarantine was impossible at the old depôt.

“With the acquiescence and assistance of the Assistant Superintendent of Immigration and Quarantine, the work is now being carried out at the coolie immigration depôt, Tataparai, and I have recently asked this Government to move the Ceylon Government immediately to take up again the question of building a permanent depôt, for trying to carry out quarantine in temporary depôts is most unsatisfactory.

“I have suggested that a place at or near Tataparai be

selected for the permanent depôt, as this appears to be the nearest place to Tuticorin, where good water is available.

"There is a large well, about 150 yards from the coolie immigration depôt, which I was assured contains very good water, and has not been known to fail for the last twelve years.

"As regards the veterinary officer's request for an increased labour staff, I am inclined to agree with him that some increase is necessary, but I should like to hear what the Ceylon Government intends to do about building a permanent depôt before sending in any proposals under this heading."

The horses of His Excellency the Governor's escort, the police horses, the draught bulls of the Public Works Department, Convict Establishment, Botanic Gardens, and Government dairy cattle have been treated when necessary.

Horses for insurance under the Volunteer Horse Insurance Scheme have been inspected as required.

Disease amongst Stock.—No outbreaks of infectious disease occurred during the year. The stomach worm disease was responsible for most of the loss.

Working of the Dairy.—The expenditure during the year exceeded the receipts by Rs. 883.37½. Considering the troublesome year experienced, and the price of milk supplied to Government institutions, it is satisfactory. At the outset of the year the manager's suspension and dismissal caused considerable trouble. In March the labour trouble occurred, many coolies bolting in consequence of the scare over inoculation against plague. In August war broke out in Europe, and curtailment of expenditure became necessary.

Until October milk to most Government institutions was supplied at 30 cents per quart, which is below cost of production. On the abolition of inter-departmental payments from October 1, the value was estimated at 40 cents per quart, which is not far above cost price, and will hardly equal it when new contracts for cattle foods are made, as a rise in price is anticipated. Had the price been 40 cents per quart (*i.e.*, about 27 cents per bottle), which is below market price, during the first nine months of the year, a fair margin of profit would be shown.

At present the place seems to suit young stock better than older cows. Seven out of thirty-one cows sent there have died from severe diarrhoea, especially during the wet weather, when there is a large amount of young scrub growth. The farm is used for the purpose of keeping growing heifers and dry cows, which return to the dairy when approaching parturition.

G. W. STURGESS, M.R.C.V.S.,

Government Veterinary Surgeon.

Colombo,

February 26, 1915.

Translation.

ACUTE MUSCULAR RHEUMATISM IN THE HORSE.

By DR. E. GRÄUB, P.D.

Medical Establishment of the Remount Depot of the Swiss Confederation, Bern.

HUTYRA and Marek give the following definition of muscular rheumatism: "As muscular rheumatism in human medicine we recognize an affection of the muscles, due to chill, causing muscular pain and corresponding functional disturbance with transient muscular contraction without inflammatory tissue changes. Against this in veterinary medicine an attack of muscular rheumatism is further characterized as depending on certain internal causes, without there being any purulent inflammation of muscle. Although there is a narrow border line between muscular rheumatism and myositis, the retention of the term muscular rheumatism is justified."

In horses muscular rheumatism is pretty frequently diagnosed. Cases of myositis with inflammatory symptoms and disturbance of general health are rarer. There are few records of such cases in horses.

Schwendimann has described a typical case which he noticed following influenza and which terminated favourably. Zschokke reports a case with a fatal termination. To him we are indebted for recent reports on the pathologic-anatomical changes. Magnin records different cases occurring in the course of strangles and influenza epidemics, some of which terminated favourably.

We will report on a case occurring in this establishment and which was observed right from its commencement.

On March 17, a five-year-old gelding was brought in. It was a hunter and had been used in our country for a year. The horse had a temperature of 40.7° C., pulse 64, respirations 24. Examination of the lungs negative. Severe angina. Little peristalsis. Dung coated with slime. Friction with ung. hydrarg. binoid. on the neck was ordered. Internally 200 grm. of ol. ricini. The next day the state was: Passage of fæces normal, appetite small. On the third day there was dullness over the right lung. Friction of the chest walls with spirit of mustard 8: 100. On the next day copious rusty brown nasal discharge. The pneumonia remained localized on the right side. Appetite better. On March 25 temperature was again normal and stood at 38.2° C.; heart beats still 64; respirations 28; dullness over lung absent and clear sounds. At the evening visit a large swelling at the left side of the withers was present, which extended to the upper edge of the shoulder-blade. The swelling was hard, warm, very susceptible to pressure, so that the horse groaned when it was palpated. Thinking it was only phlegmony due to the neck strap of the rug being too tight, warm Priessnitz's poultices were ordered. In the evening the attendant noticed that the patient which hitherto had not laid

down, fell down with a groan as if too weak to stand. Early on the horse got up once with much trouble, but soon laid down again. In the morning temperature was 38.4° C., pulse 64, breathing 28. The horse groaned and sighed uninterruptedly and seemed as if totally paralysed. Dung and urine were not passed, and the former was manually removed and the latter voided by urethrotomy after catheterization had failed to empty the bladder. Hæmoglobin cylinders and kidney epithelium were found in the sediment after centrifugalization of the urine and a large quantity of unchanged red corpuscles. The horse died. *Post-mortem* showed blackish red, not clottable blood, yellow hepatization of the lungs, friable and clay-coloured liver, spleen enlarged and with a tumour present the size of an egg, kidneys enlarged, capsule easily peeled off. Tissue of the cortical layer of the spinal cord covered with small round vacuoles; muscular tissue along the back soft and friable.

Sections of muscle imbedded in celloidin showed disintegration of muscle and round cell infiltration, and in some places hyaline degeneration of the muscle fibres.

Gräub considers that cases like this one showing acute polymyositis are probably due to intoxication or infection and are different from those rheumatic ailments generally due to chill.—*Swiss Journal of Veterinary Medicine.* G. M.

Review.

Aide-mémoire du Vétérinaire: médecine, chirurgie, formules, police sanitaire et jurisprudence commerciale. By H. J. Gobert, First-class Veterinary Surgeon to the Army Remounts. 1 vol., 736 pages, with 252 figures. Bound, 10 francs. Library J. B. Baillière et fils, 19, Rue Haute-Feuille, à Paris.

This little volume is intended to help veterinary surgeons to remember the salient facts regarding all matters they are called upon to deal with in daily practice in connection with disease, surgery, obstetrics, therapeutics, sanitary police, inspection of meat, and commercial jurisprudence. The practitioner not blessed with an encyclopædic memory will find it a veritable treasure if used as a book of reference, and if referred to habitually he is not likely to overlook or omit any important detail in connection with any branch of his work or any problem item in that branch that may crop up in the course of his labours. We make more mistakes by not looking than by not knowing, and this volume helps us to look discerningly. It does not go deeply into the problems of disease, but the compass points on our sea of operations are clearly indicated, and no veterinary surgeon who uses the *vade mecum* intelligently ought to get lost on the pathological ocean he seeks to explore effectively, to hold in check, and rule beneficially. That the work has been of great value in France, and looked on favourably by a large

circle of professional men, is proved by the fact that Monsieur H. J. Gobert now edits the fourth edition of a volume that was originally compiled by Monsieur Signol, and subsequently re-edited twice by Messieurs Signol and Cagny.

Numerous additions bearing more particularly on the chapters devoted to contagious diseases, surgery, therapeutics, sanitary police, and inspection of food have been made by Monsieur Gobert to the original and two subsequent editions. Sanitary legislation has been entirely overhauled and revised in France during the last decade, and the author has reviewed all the laws and decrees in connection with contagious maladies.

The illustrations add to the value of the letterpress, but a few of them, like some of the matter in the book, are a bit old-fashioned, and in some cases superfluous. The equine mouth-gags look as if they had been reproduced from examples that an up-to-date practitioner ought to have scrapped, and we think that tail-nicking operations are best consigned to oblivion nowadays. Nobody does them, and nobody wants to have them done.

G. M.

Obituary.

JOHN W. BROWNLESS, M.R.C.V.S.

THE news of the death of Mr. Brownless, from wounds received whilst serving in the Dardanelles, will be received with regret by practitioners in the West End of London, amongst whom he was well known as an "honourable opponent." Somewhat bluff in manner, but thoroughly straight in his dealings, he had a large *clientèle* in Kensington and district, having succeeded to the practice of the late W. Nettleton, M.R.C.V.S., in St. Mary Abbott's Terrace. His practice included several of the polo clubs, for the convenience of which he had established a branch practice at Barnes. His college career was a distinguished one, and he held the South African medals, having volunteered as a civilian veterinary practitioner during the Boer War. He had gone out to the Dardanelles with a regiment of artillery.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.



THE LATE MR. CHARLES HARTLEY, F.R.C.V.S.

THE VETERINARY JOURNAL

SEPTEMBER, 1915.

Editorial.

POLYVALENT SERUM FOR WOUNDS.

In regard to the references in last month's issue of the use of polyvalent serum in the treatment of wounds, we give this month some reports of cases treated by Monsieur Cuvillier. The article and reports originally appeared in *Revue Générale de Médecine Vétérinaire* for July 1, 1915. Monsieur Cuvillier puts forward some good reasoning in favour of the serum, and we hope that it will have a sufficient trial over an extensive field. Hitherto the employment of sera has been chiefly against specific diseases, and the use of a serum in the treatment of wounds in veterinary practice is quite novel. Any agent that supports and helps the leucocytes to defend the body against bacterial invasion and to bring about the healing of lesions ought to be of special value in this War. The study of wound treatment has been greatly stimulated recently, and it is a sign of the times that Dr. Alexis Carrell, of the Rockefeller Institute, U.S.A., assisted by Mr. Henry Dakin, the chemist, has just claimed to have discovered a new antiseptic which will destroy the poisonous agents in wounds without damaging the tissues. A medication that will make a wound bacteria free, followed by one that will aid the cells of the body in their work of defence and repair, seem to be all that can be desired or needed in wound treatment.

G. M.

AGRICULTURE AND THE VETERINARY PROFESSION.

WHEN this War is over it is probable that many of our soldiers will not return to the sedentary occupations in factories, shops, and offices that they engaged in before enlisting. They will have looked long on the fields, the sky, and the hedgerows, and many of them will have mingled with men the greater part of whose life has been spent in the open air in close contact and communion with Nature and agriculture. They will have come under the fascinating influence of the out-of-door life. Little wonder, then, if they shy at going back to an existence with inadequate breathing space and small room for healthy expansion and advance. What they saw but in patches previously they thought only transiently about, but now the call of the country will have become a fixed influence. "They will know what they prefer, instead of humbly saying Amen to what the world tells them they ought to prefer, and so they will keep their souls alive." There is likely to be an accession to the army of the workers on the land, and it will be well for the Motherland if she endeavours to keep as much as possible of this company within her own borders.

An increase of food supply (and this includes an augmenting of the number of live stock) is a matter of vital importance to this country both now and in the future. It is ever a reproach to us that we are dependent for five-sixths of our daily bread on overseas production. We are glad to see signs that there is an awakening to the hazard of this fact and that opportunity is to be given for agricultural speeding up. The Board of Agriculture and War Savings Committee is out to see that as much as possible is to be got out of all available land, that uncultivated areas and vacant building plots are acquired, and that co-operation and mutual cultivation of the soil are stimulated and encouraged. Let us hope that this activity will not be merely a flash in the pan or a thrust in a bag. Not any too much has hitherto been done for the agriculturist here. The ability to pay rent and rates has been looked on more as a reason for letting the farmer alone, and for ignoring the peasant, than for encouraging them to grow and expand. The major operations of agriculture upon which the regular food supply of the nation depends ought not to be subject to grave pecuniary risks and violent fluctuations

of the market. It is a flagrant anachronism that to be patriotic, grow wheat, and become bankrupt should be natural sequences. They ought never to be sequences at all. Increased activities in the industry of agriculture must certainly be backed up by capital; the more money that is put into the land the greater the output of wheat, oats, barley, rye, and potatoes, the greater the stores of hay, straw, cereals, and roots and the larger the head of stock that can be kept. The State must support and protect these operations from their initiation to their fulfilment. In this new life and fresh vigour in agricultural circles the veterinary surgeon must be prepared to play a full and worthy rôle. His prosperity depends in a marked degree on the successful progress of the science and art of cultivation. Many of the embryo embarkers on the sea of agriculture will need sound and reliable advice not only on the ailments of their stock but on hygiene, and the daily practices that help to keep disease away.

We had over 5,000,000 cattle, 13,000,000 sheep, and 2,000,000 pigs in this country in 1914. How many of these were bred, fed, and reared up to the best advantage? There is an abundant field, exclusive of horses, for the play of sound reasoning and expert advice in animal matters, and in this counsel the veterinary surgeon should take a major part. It has often seemed to us that we are behind other countries in the knowledge of the best means to an end in the production of any required animal form and qualities. At any rate, if we have the knowledge we do not practise it widely and deeply enough. Although we have men who need no instruction in the methods of breeding and rearing, yet does the general intelligence on these subjects reach a high level? We think not. The argument has been advanced in opposition to the recent Order against calf slaughter that so many poor calves are dropped that it will not pay to rear them. Surely this is a reflection on the breeder. The price of animal foodstuff is almost always disproportionately higher than the recompense for the products of breeding and rearing. Not only is it in the interests of agriculture and the State that the number of the domesticated animals should increase, but also that the intrinsic value of the supply should augment. A good understanding of the means and ways necessary to produce the best creature form and capabilities will pay. With models before us or in our mind's

eye we ought to be able to work up to them and even improve on them. Many of our agricultural schools and colleges are doing excellent work in the matter of teaching the principles of a good knowledge of breeding and rearing operations, but in our opinion they are making worthier and more commendable efforts in the direction of research and advice on the constituents, value, and effects of feeding-stuffs.

That they are able to advance much in regard to the latter, whilst only keeping at a moderate level as regards the former, is chiefly due to the lack of a copious yet concentrated field for the exercise of the activities of investigation and research. At present the opportunity for the veterinary surgeon to study matters of zootechny and to collect facts regarding the science are almost unique. Are we taking full advantage of the convenient occasions? It has been well said that everybody from outside (with the exception of the gas inspector and the rate collector) that enters a veterinary surgeon's establishment is in trouble, doubt, or difficulty of some kind. It is the province of the professional man to equip himself fully to succour and comfort these harassed individuals. Our influence on agriculture should always be good and valuable. Let us see to it that we strive ever to be men of full knowledge, capable of giving sound and timely advice on all matters connected with animals.

G. M.

A BROAD view of evolution raises a strong presumption that there is no predominance of pain or pleasure, and of good or evil, but that the development of these and other pairs of opposites has been equal and parallel. It follows from this, that birth and death ought to be matters of indifference to us, that the high value we all attach to life is a delusion, and that birth and death are merely devices for maintaining the balance between adaptation and misadaptation, which is necessary for the preservation of the species. The answer to these doubts is, that life is valuable in proportion to the greatness of the positive values which it offers us the prospect of realizing; the life of a free man is of more value than the life of a slave. Here, however, we must remember that life at the same time offers negative values in the same proportion; what the actual resultant value shall be depends entirely for each man upon himself.—From "By-paths in Evolution," by Colonel R. H. Firth, *Journal of the R.A.M.C.*

Selected Articles.

THE EFFECT OF THE CATTLE TICK UPON THE MILK PRODUCTION OF DAIRY COWS.

By T. E. WOODWARD AND W. F. TURNER.
Dairy Division, Department of Agriculture, U.S.A.

AND
COOPER CURTICE.
Zoological Division, Department of Agriculture, U.S.A.

[Abridged.]

INTRODUCTION.

THE common cattle tick, *Margaropus annulatus*, infests the cattle throughout the greater part of Florida, Georgia, Alabama, Louisiana, and Arkansas, large portions of Texas, Oklahoma, Mississippi, South and North Carolina, and small areas in Virginia and California. On account of the enormous losses occasioned by the parasite it has been necessary to quarantine the area infested, so that cattle outside of this area may be protected. Ever since 1906 tick eradication in the infested area has been actively pushed by Federal and State governments, co-operating with citizens of tick-infested regions, to destroy the pest. While the majority of farmers admit some loss, few are aware of its extent, hence the experiments reported in this bulletin were undertaken to bring out the facts, particularly in relation to the effect of the tick on dairy cows.

The cattle tick is an almost exclusive parasite of cattle. While the ticks may mature on horses, mules, and possibly deer and sheep, their control on these animals has proved to be comparatively easy. All ticks come from eggs laid by the adult female ticks. An engorged female tick dropping from a cow completes oviposition in from five days to a week; the eggs hatch as a rule in about twenty-one days in ordinary summer weather; the issuing seed ticks crawl upon the grass and await the coming of cattle upon which they crawl when opportunity offers; they then reach maturity in from twenty-one to twenty-five days.

While maturing each tick abstracts a definite amount of blood from an animal, and to that degree injures it. The quantity of blood abstracted is many times the weight of the ticks when

grown, for these represent only that part of the solids and fluids of the blood which may be converted into the tissues of the tick, the remaining solids and fluids being rejected. The amount of blood taken by a single tick may be relatively small, but the total amount drawn by thousands of ticks on one cow cannot fail to be injurious. If each tick represents but a drachm, or a teaspoonful, of blood, a few over 1,000 would represent 8 lb. of blood. It is possible that each tick absorbs more than a drachm of blood.

But the greatest disturbance created by the tick seems to be, not in the amount of blood abstracted, but in the fact that it is the carrier of the germ of Texas fever which it transmits to cattle. When cattle that have never become accustomed to ticks are infested they become very sick and usually die. This may occur anywhere, either within or without the tick-infested region. Cattle that survive the ticks usually remain immune to their worst effects afterward. However, as time passes the important fact that no cattle in the quarantined area of the South are ever safe from the effects of Texas fever, either in its acute or chronic form, becomes more and more impressed on those who have to study the affected cattle.

PLAN OF THE EXPERIMENTAL WORK.

As the dairy industry is becoming an important branch of southern agriculture it was thought desirable to ascertain the effect of the tick on the milk production and body-weights of dairy cows. Twenty grade Jersey cows* of about average dairy quality were selected in the early part of their lactation periods. They were in fair condition of flesh at the beginning, and all had been tick-infested at some time. The animals being immune to ordinary attacks of tick fever, the results should be applicable to the average dairy herd in the tick-infested areas. These cows were divided into two groups of ten animals each, the two groups being balanced as nearly as possible in regard to milk and butter-fat production, condition of flesh, and size. One group was freed from ticks by spraying with "tick dip B," an arsenical solution used by the Bureau of Animal Industry in the tick-eradication

* The cows and the feed lots used in these experiments were provided by the Anthony Farms Co., Anthony, Fla., of which Mr. E. C. Beuchler is manager and vice-president.

work. Data were taken on only nine cows of this group, as one cow received an injury to her udder which stopped her milk flow early in the test. The other group was kept tick-infested by applying seed ticks at regular intervals. The degree of infestation varied with different animals and with the entire group at different times during the course of the experiment.

The experiment began May 21, 1913, and lasted during a period of 140 days. The milk of each cow was weighed and a sample taken at every milking for a composite fat test at the end of each ten-day period. The body-weights were taken for ten consecutive days at the beginning of the work; thence once every ten days until the last period, when they were taken for ten consecutive days as at the beginning of the work. The weights were taken at about the same hour and under the same conditions each time, so that the extent of fill, both as regards feed and water, would be similar. The treatment of the two groups in all respects other than ticks was as nearly alike as possible.

Feeding.

The tick-free group of cattle were fed as much alfalfa hay as they would eat readily, and enough corn chop, wheat bran, and cotton-seed meal, mixed in the proportions 4:2:1, to maintain the body-weights. The aim was to give the infested group the same kind and amount of feed, but toward the close of the experimental period these cows failed to consume as much hay as the tick-free cows. In order to make the digestible nutrients consumed practically equal for each group, the grain ration of the infested cows was raised 1 lb. for each 2½ lb. of hay refused. Both groups of cows had access to salt and water in unlimited quantities.

The Ticks.

The seed ticks used to obtain the various degrees of infestation in the cattle were the progeny of mature ticks obtained from several sources. The supply of ticks was secured through the co-operation of Dr. Charles F. Dawson, of the Florida State Board of Health, as the local supply was insufficient. Dr. Dawson's first material was collected from Tallahassee, Kissimmee, Dade City, and other places in Florida. A few small lots were received subsequently. The earlier adult ticks were collected between April 13 and April 28. The seed ticks or larvæ from

eggs laid by these emerged between May 22 and June 2 following. On June 12 and 14 two other consignments were received. The resulting broods seemed sufficient to ensure thorough infestation of cattle during the first weeks of the experiment.

A second source of seed ticks was the Anthony Farm cattle not under test. This supply, together with that already mentioned, was sufficient to last until the middle of July by applying them but once a week. These two sources of supply proved to be insufficient, and a third lot was obtained from the Zoological Division of the Bureau of Animal Industry. These were mainly a portion of the original collection by Dr. Dawson, which had been sent by him to Washington and intended for another purpose. One flask of specimens labelled as originating in Texas accompanied these. This Washington consignment was applied during July. As fast as the ticks matured on the experimental cattle they were picked off, and the seed ticks derived from them became available about August 1. From that time on there was an abundance of material.

The time of application of the ticks may be roughly divided into two periods, viz., from June 4 to July 28, in which ticks were applied at intervals of seven or eight days, and from August 1 to September 25, in which they were applied on each alternate day with but two exceptions. The effect of weekly applications was to cause the ticks to ripen in groups covering about five days; the alternate day applications caused a more continuous and intense infestation. The exact fluctuations of this were not determined on account of cessation of gathering ticks when sufficient had been obtained to complete the experiment.

Collections of ticks from the experimental cattle were made twice daily during milking time from June 26 to September 4. This was necessary in order to obtain seed ticks for a continuation of the experiment into the fall months. The deleterious effects of the ticks were less than if they had been allowed to mature on the cattle; but in such case future seed ticks would not have been available. Additional effort to acquire material from other sources demonstrated the futility of depending upon outside sources for seed ticks. As the experiment proceeded it became too late to employ other cows for raising ticks, a plan which would be better if the experiment were to be repeated.

The count of the ticks made and given in an appended table does not include all that became attached to the cattle, for some dropped off, some were picked off by chickens, and others were licked off by the cattle themselves. Also many incompletely mature ticks were collected which might have added their share of damage to that already produced. The infestation during the earlier period, June 4 to August 5, was practically like a fall infestation in intensity, excepting that the ticks were not maturing equally throughout the week, thus causing milder effects during the time that the ticks matured less rapidly. Infestation on different cows was from slight to gross during the whole experiment. Under farm conditions pasture infestations may occur daily, thus making continuous appearances, such as occurred during only a part of the week in the experiment, and producing consequently more severe injuries. The collecting of ticks was continued until within thirty days of the close of the experiment, when the supply was sufficient to maintain infestation until the completion of the work.

The infestation from August 20 to October 7 was unusually large in those animals which were susceptible to the ticks; in others the infestation was only slight, as throughout the experiment. In the weekly infestation there were three or four broods on the cows at the same time, viz., newly attached seed ticks, week-old, two-weeks old, and, depending on the exact date, maturing ticks. In alternate-day infestation there were eleven broods on at once. On cows which favoured their development one could feel by touch the young ticks that were covered by hair. From the beginning difficulty was experienced in gauging the number of young ticks that should have been put on the cows. In the weekly infestation all the available ticks were used. The effects would not have been different had the same numbers been applied at intervals throughout the week. The infestation would have been less visible, however.

Effort was made to apply about the same number each time, but later application gave better results than earlier ones. While the number placed on the animals was purely a matter of judgment, it is probable that the numbers applied from day to day did not vary so much as did the vigour with which the ticks attached themselves to the cattle. After the seed ticks were applied no changes could be made, and results alone proved the numbers that remained on the cattle.

The seed ticks were applied by permitting them to crawl on to the cow's hair in various places from the edge of pint fruit jars used in hatching them. Sufficient time was allowed after hatching to permit the seed ticks to harden and become brown. They had been confined in the jars by cotton cloth. This cloth was used later to wipe up the ticks and scatter them over the cattle. In the first period of the experiment the ticks were mainly placed on the backs, bellies, and escutcheons of the cows, but in the second period they were placed more generally over the entire body.

Some of the tick masses became too moist during oviposition and incubation in the wet season, and this caused the masses to adhere and resulted in the death of the larvæ, especially when too many of the adult ticks were put together. Previously many egg masses had been kept too dry, presumably on account of atmospheric conditions and the small number of adults placed in a jar. Later on better conditions were secured by collecting the ticks in paper bags in lots of 200 or 300 and transferring them to the cloth-covered jars when they were nearly hatched.

These methods caused the numbers of seed ticks occurring on the cattle to be purely guesswork. Failure resulted in spite of special efforts to infest those cattle that presented the fewest adult ticks. Such were nearly immune to ticks.

RESULTS OF EXPERIMENTS.

The damage done to the infested cows by the ticks seems to have arisen from two distinct causes: first, a fever incited in some of the cattle at various periods, and, second, loss of blood abstracted by the growing tick.

Fever caused by the Ticks.

The presence of fever on various dates was ascertained. No attempt was made to take daily temperatures, as the matter of taking any temperatures at all was an afterthought rather than part of the plan. One set of temperatures was taken at 9 a.m.; all others at 4 p.m. The temperatures of the tick-infested cattle were higher than the checks and nearly always above normal. The temperatures of the tick-free cattle were also often above normal. This may have been due to moist, hot conditions of the atmosphere, since only in exceptional cases were the temperatures abnormal on cool days.

Blood taken from cows 12 and 13 and observed to run from the tick wounds of cows 15, 17, and 20 in particular was abnormal in being too thin. The red blood clots formed but a small part of the mass. All these animals, also cow 16, were noticed to be visibly distressed as to feelings and respiration on various occasions. Cow 15 alone showed a slight pendulous swelling under the lower jaw. Cows 11, 14, 18, and 19 were infested with but few large ticks and not many visible small ones. Neither were they apparently ill at any time. To what quality these cattle owed their immunity from ticks is not known. They looked more like Jersey cattle than the other ones infested. In colour cow 14 was lemon fawn and cow 19 was light fawn, and the latter's coat

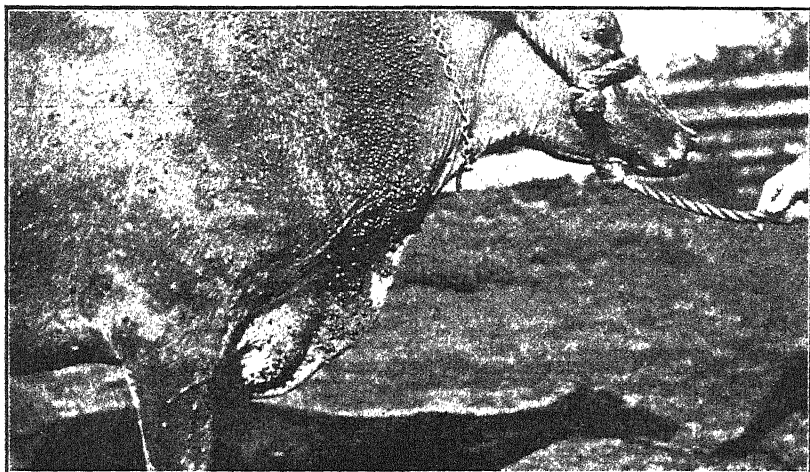


FIG. 1.—Cow No. 20, heavily infested on neck and shoulders. Photo taken September 24, 1913.

was very short and thin. Cow 15, the cow that became most heavily infested, was a large red brindle cow that resembled the Shorthorn or beef type. This cow seemed to resist the effects of the ticks until toward the end of the experiment, but finally failed rapidly in giving milk, and died within a week after the close of the experiment.

Cow 20 was infested almost as heavily as cow 15. She was a large Jersey-like cow of lemon-yellow colour (fig. 1). Her milk failed quite early in the experiment. She presented a dejected appearance for some time, but later recuperated and gained or

held her weight to the end. Externally there seemed to be no reason why ticks developed so much more on her than on cow 14.

Cow 12, a mongrel Jersey with black predominating and white underparts, was the next most infested (fig. 2). She became ill, but acquired the habit of licking herself as clean of ticks as she could and of being assisted by other cows. She seemed to recover from her fever and improved somewhat in condition.

Cows 13, 16, and 17 were infested about alike, but Nos. 13 and



FIG. 2.—Cow No. 12, heavily infested on rear parts. Photo taken July 19, 1913.

17 suffered more from fever than No. 16. There seemed to be no particular difference in the coats of Nos. 13 and 16 sufficient to explain why No. 16 should be less infested. They were red cows of mixed origin and doubtful ancestry. Cow 17 was a very dark cow with white underparts, having a rather fine Jersey-like head. The sickness reduced her milk flow much more than was the case with No. 13. As a whole, the light fawn-coloured cows seemed to resist ticks better than the dark-coloured ones.

The sickness in the cattle was not entirely due to the number of ticks, for cows that had fewer ticks by far than cow 15 were sick much earlier. It has previously been stated that one of the sources of ticks was the Anthony farm. This farm sustains a large dairy, and frequently the herd is replenished with fresh milkers brought from Georgia and the surrounding country. According to the superintendent, many go through acclimatization or Texas fever. It is quite probable that ticks from some of the acclimatized animals furnished the first protozoa (piroplasma) to produce disease in the experimental animals; it may be that afterwards ticks from sick cows in the experiment transferred the disease to other cows. While all these cattle were used to ticks, it is quite evident that they were not thoroughly immune to fresh attacks of disease, whether due to blood-letting or piroplasma parasitism. That immunity is a variable quantity is accepted by many southern cattlemen who have studied and had experience with traded cattle.

The ten check cattle remained free from ticks through keeping them in a separate pen and stalls; otherwise they were under similar conditions as the infested cattle. Although they were separated from the tick-infested group in the stable by the mangers only, and later turned out into a small field on account of the muddy condition of the barn lot, there was insufficient manifestation of small ticks to show pen and yard infestation. However, it was thought necessary to spray these cattle on occasions because of a few scattered ticks which were presumably carried to them on the rag with which the udders were washed. Spraying was followed for a day or two by a diminished quantity of milk, after which the normal flow re-established itself. The spray used was arsenical tick dip B, a concentrated solution which, when used in prescribed dilution, produced a subsequent slight exfoliation of the epidermis.

The deleterious effects of the ticks were not so apparent in the experiment as they would have been had more ticks been developed early in the experiment. In that case early losses would have been reflected throughout. It is probable that excessive invasions of ticks on freshening cows in spring reduces their milk flow by fully one-half before the lactation period is ended.

An attempt was made to put on about the same number of

seed ticks at each application, so that the number applied from day to day was probably fairly uniform. Seed ticks secured from adult ticks from outside sources seemed to be less vigorous and to have more difficulty in attaching themselves to the cows than those more recently obtained from ticks that had matured on the Anthony cattle, so that fewer of them matured, and consequently less damage resulted than when the Anthony ticks were used. This apparently low vitality of the seed ticks obtained from outside sources, together with the light infestation obtained at the early part of the work, delayed any definite results until toward the latter part of the experimental period.

The cows used were so-called immune, yet all the tick-infested group except the four lightly infested ones suffered from attacks of fever at different times during the experimental period. This was not due entirely to the number of ticks maturing upon these animals, for cow 15, which showed the heaviest infestation throughout the entire period, was one of the last to suffer from an attack of fever.

Effect of Ticks on Milk Production and Body-weight.

Although each of the cows used in this work had been tick-infested at some time, the individual variation in the degree of infestation that could be obtained was so wide that two sub-groups were made of four animals each, one of which will be called the lightly infested and the other the heavily infested group. These sub-groups show the effect of varying degrees of infestation upon the body-weights and milk production of the cows in a manner more marked than when the two entire groups are compared. In the discussion which follows only the summaries of groups are given. Complete data for each cow will be found in the appendix.

Comparison of Tick-free and Tick-infested Cows (entire groups).

At the beginning of the experimental period the two groups produced practically the same amount of milk—the cows of the tick-free group producing an average of 176.2 lb. during the first ten-day period, and those of the tick-infested group an average of 177.9 lb. During the final ten-day period the cows of the tick-free group produced an average of 92.1 lb. of milk, a decrease of 47.7 per cent. from their production during the initial

period, while the cows of the tick-infested group produced an average of 60.6 lb. per cow, a decrease of 65.9 per cent. when compared with their first ten-day period. It should be noted especially that while the tick-infested cows produced 1 per cent. more milk than the tick-free cows in the beginning, they produced only 65.8 per cent. as much during the final period. The two groups consumed practically the same amount of feed during the entire period. The percentage of fat in the milk of each group increased toward the close of the experiment, that of the infested group showing a slightly greater increase.

At the beginning of the test the tick-free cows weighed on the average 719.2 lb., and the tick-infested 707.2 lb. During the experimental period each group increased in body weight, but the increase of the tick-free group was greater than that of the tick-infested. During the final ten-day period the cows of the tick-free group averaged 763.4 lb. in weight, an increase of 6.1 per cent., and those of the tick-infested 732.9 lb., an increase of 3.6 per cent. from the initial weight.

In making this comparison it should be remembered that during the entire experimental period the two groups consumed practically an equal amount of nutrients, and that toward the latter part of the experimental period the milk production of the tick-infested group was considerably decreased, so that this group was fed an amount in excess of that required for milk production. Presumably this excess of food would tend to make flesh and thus offset any detrimental effect that the ticks would have upon the body-weights.

Comparison of Tick-free and Heavily Infested Groups.

Four cows in the tick-infested group were soon found to be more easily infested than the remaining six. A gross infestation of these four cows was obtained early in the experimental period and was maintained throughout the test. At different times all four suffered from attacks of fever, with an almost total loss of appetite and a falling off in milk flow. One, which suffered from an attack of fever at the end of the experimental period, died shortly after the close of the work.

The heavier the degree of infestation, the greater proportionately the injury. This is likewise proved to be true when the body-weights of two groups are compared.

Comparison of Tick-free and Lightly Infested Groups.

While four cows of the tick-infested group proved to be easily infested, another four of the same group proved to be very resistant. The immature ticks were applied to these four cows with the same care and in as large numbers as they were to the heavily infested animals; in fact, extra efforts were made to obtain a heavy infestation upon these resistant animals. However, at no time during the experimental period were any of the four so heavily infested that the degree of infestation could be classed as gross, and for the greater part of the period none of them was carrying mature ticks. The decrease in milk production was more than in the tick-free cows, but considerably less than in the heavily infested animals.

Comparison of Lightly Infested and Heavily Infested Groups.

While the heavily infested cows produced more milk during the initial period and through the greater part of the experiment, they also consumed more feed than those of the lightly infested group. At the beginning of the experimental period the four heavily infested cows produced an average of 212.6 lb. of milk, while the four lightly infested cows produced an average of 157.5 lb. during the same ten-day period. During the final ten-day period the heavily infested cows produced an average of but 54.5 lb. of milk, a decrease of 74.3 per cent. from their production during the initial period. During the same period the lightly infested cows produced an average of 68.6 lb. of milk, a decrease of 56.4 per cent. from their production during the first period. While the heavily infested cows produced 35 per cent. more milk than the lightly infested during the initial period, they produced only 79.4 per cent. as much during the final period. When the two groups are compared with the tick-free groups, it is seen that the lightly infested group produced during the final period of the experiment 81.4 per cent. as much milk as the tick-free, while the heavily infested group produced by 57.6 per cent. as much. A comparison of the body-weights of the two groups shows the heavily infested with an average weight per cow of 700.7 lb. during the initial ten-day period, which decreased to 691.4 lb. per cow, or 1.3 per cent., while the lightly infested cows, with an average weight of 694.4 lb., increased to 736 lb. per cow, or 6 per cent.

No figures are given on cost of milk production, as the aim was merely to measure the effect of tick infestation on yield of milk and body-weight. As the cows were kept in comparatively small enclosures, the cost of milk production was higher than under ordinary conditions when cows are on pasture.

EFFECT OF SPRAYING OR DIPPING IN AN ARSENICAL SOLUTION UPON THE YIELD OF MILK.

At four different times during the experimental period the cows of the tick-free group were sprayed with tick dip B, an arsenical solution. This was done to keep the tick-free cows absolutely free from ticks. Each spraying caused a temporary reduction in the milk yield. The average yield for the first day after each spraying, when compared with the average of three days preceding spraying, showed percentage reductions in each case as follows: 8.7, 27, 8.3, and 5.7 per cent. It will be noted that the reduction was much the highest for the second spraying. On the day prior to this spraying and for two days thereafter timothy hay was fed, owing to a shortage of alfalfa. This, no doubt, had its influence on the milk yield, as indicated in the excessive shrinkage at that time. From three to five days were required for the cows to return to their normal production. The average of five days after each spraying compared with the average of three days preceding spraying showed reductions, respectively, of 6.2, 21.7, 4.5, and 7.6 per cent. Disregarding the second spraying, the average reduction for five days was 6.1 per cent.

These results with spraying are similar to those obtained with dipping during the 165-day test conducted by J. H. McClain, of the Dairy Division, Bureau of Animal Industry, at Summerville, S.C., in 1912. In this experiment ten cows were dipped seven times with a solution of tick dip B, the dippings coming at intervals of about twenty-one days, with an average decline in milk production, for two days, of 10.6 per cent. after each of the seven dippings. But apparently the cows became accustomed to the dipping process, for there was no appreciable decrease in the milk flow after the first four dippings except the natural decrease due to the advance in the lactation period. The average decline in production was approximately as follows: After each of the first four dippings, milk, 14.8 per cent.; fat, 8.9 per cent.; after each

of the last three dippings, milk, 1.9 per cent., but an increase of 10.6 per cent. in yield of fat.

That the heavily infested cattle in our experiments yielded fully 40 per cent. less milk than the check animals at the close of the experiments, and that even those lightly infested gave less by 25 per cent., has been heretofore recorded. Conversely, we may infer that the check cows in this experiment and those regularly dipped in the Summerville experiment gave this additional quantity of milk on account of being kept free from ticks. Had this freedom been obtained without the use of arsenical dips, it is quite certain that an amount of milk equal to 10.6 per cent. during one-tenth of the time in the Summerville experiment, and to 6.1 per cent. during one-seventh of the time in our experiments, would also have been saved from loss on account of the ticks. These differences emphasize the good results of the use of arsenical dips, and above all, of the necessity for the complete eradication of ticks so that the remedy, which of itself temporarily reduces the flow of milk, will be unnecessary.

SUMMARY AND CONCLUSIONS.

The cattle tick has a decidedly injurious effect upon supposedly immune dairy cattle, the extent of the injury being largely dependent upon the degree of infestation. The effect is more pronounced upon the milk production than upon the body weights when a sufficient supply of food is given.

At the beginning of the test the tick-free and tick-infested groups gave practically the same amounts of milk; at the close the tick-infested gave only 65.8 per cent. as much as the tick-free.

The tick-free group gained 6.1 per cent. in body-weight; the tick-infested 3.6 per cent.

Spraying or dipping tick-free cattle in an arsenical solution causes a marked though temporary decrease in milk flow. In this experiment there was an average reduction of 6.1 per cent. from the normal milk flow for a period of five days following each of the four applications of the arsenical solution.

Resistance of cattle to infestation by the tick is a variable quality. Of the ten animals in the tick-infested group, four became grossly infested; two more so than the average, and the remaining four but lightly infested.

The death of cow 15, due to excessive tick infestation, and

various recurrences of fever in the other animals, emphasizes the extreme hazard of cattle being continuously subjected to these losses by the tick. Cow 15 was one of the best of the tick-infested group, and represented at least a 10 per cent. loss from the capital invested in tick-infested cows. Furthermore, the losses observed in this experiment were sustained on rations sufficient to maintain body-weights. It is thought that had there been but a scant supply of food, as sometimes occurs when cows are on pasture, the tick-infested cattle would have suffered earlier and probably to a greater degree than they did. The losses in this case were in spite of a good maintenance ration. It is probable that much of the spring losses in cattle now laid to starvation, due to lack of pasturage, is materially aided by blood depletion due to ticks, and that repeated dippings would save many cattle otherwise lost.

These experiments are not extensive enough to furnish an exact measure of the amount of decrease in milk flow due to infestation, but they show that the losses are considerable and vary in immune cows largely in proportion to the extent of infestation, since in all cases the milk flow decreased faster in the heavily infested than in the lightly infested cows. This is additional evidence that the tick is a great hindrance to profitable dairying in the South. Even in so-called immune cattle, ticks cause irritation of the skin and withdraw blood that otherwise would produce milk or meat.

Fever-producing parasites are present in the blood of cattle once infested by ticks, though they may be so few in number that no symptoms of the disease are apparent. The danger from them lurks there, nevertheless, for under certain conditions the parasites may multiply so rapidly as to cause marked disease or death, or they may be transferred by ticks to uninfected animals. Thus the tick constitutes a source of danger, and should be exterminated. Furthermore, eradication must be by co-operative, concerted action. One farmer may free his premises of ticks, but reinfestation is liable to occur at any time from neighbouring farms or strange cattle, unless the entire community is free from the tick.

The only means of preventing losses by ticks is through disinfection and clean pastures. While dipping may temporarily diminish the quantity of milk given, in the long run it largely conserves the flow of milk. The arsenical solution should be used to frustrate the great dissemination of ticks during their most favourable season. In infested areas where there is no concerted effort to eradicate ticks it may not be wise to use the solution on slightly infested milch cows.—*Bulletin, U.S. Department of Agriculture.*

GENERAL PRINCIPLES TO BE OBSERVED IN THE
INSPECTION OF THE CARCASSES AND ORGANS
OF TUBERCULOUS ANIMALS WITH A VIEW TO
DETERMINING THEIR SAFETY AS ARTICLES OF
HUMAN FOOD.*

By HJ. HANSSON.

Veterinary Officer of Health, Stockholm.

UNQUESTIONABLY tuberculosis ranks first amongst the morbid changes which occur in the carcasses of animals, and plays a more or less important part in the modern inspection of meat. Statistics from public slaughter-houses and other controlling centres for the inspection of meat show that tuberculosis is the cause of millions of kilos of meat being withheld yearly from consumption. It is therefore not to be wondered that on the part of experts the judging of tuberculous meat will always be a subject for their unceasing attention. Quite recently several of the most prominent amongst the veterinary hygienic profession have devoted much time and trouble to the solution of the problem of judging of tuberculosis. The investigations made have given us the certainty that to a great extent the old principles for the judging of meat of a tuberculous animal must be dispensed with.

The fundamental question of the whole judging of tuberculosis is if the cattle tuberculosis is transferable to men and if it can produce illnesses of a serious nature in them. Since the German and English tuberculosis committees have clearly proved the transferability of cattle tuberculosis to human beings, and, above all, since the English committee has established that almost 50 per cent. of the investigated cases of intestine or mesentery glands tuberculosis in children, which have proved fatal, the tubercle bacilli producing the illness have solely been those of the bovine type, it will be naturally understood that all meat of tuberculous animals cannot be handed over, but that some forms of tuberculosis demand taking far-reaching measures for the prevention of such meat being circulated without any restriction.

When must the meat of a tuberculous animal be considered as unfit for human food? Before I can enter into this question

* Paper prepared for Tenth International Veterinary Congress, London, 1914.

I will lay before you the principles which during the last years have generally been accepted. Since Weigert from a purely pathologic-anatomic point of view has defined the conception of local and general tuberculosis, the merit of having brought order and clearness in the judging of tuberculous meat is due to Johne, who established the principle: The generalization of tuberculosis proves that the infective matter spreads in the main circulation of blood and infects the meat, therefore it must be considered as harmful for human food; however, the pure local tuberculosis does not prevent the meat from being handed over after the infected organs or parts have been destroyed. After it had been proved through the investigations of Nocard that tubercle bacilli circulating in the blood retain their virulence at the most five or six days, and that consequently in case of only one generalization for so long a time back, that the process of generalization must be considered as completed, no tubercle bacilli can circulate in the blood in such a case, and after it had been proved by Hartenstein that tuberculous changes in one part of carcase must not necessarily be a sign of the whole carcase being injurious to health, the judging of the same on the suggestion of Ostertag was mitigated thus, that in case of such a completed generalization only that part of the carcase with the lymphatic glands belonging to it, where tuberculous changes had been ascertained, must be considered as injurious to health. These principles have upon the whole been employed up to now. Accordingly we pay more attention to the presence and degree of such tuberculous changes, which point out that an infection of the main blood circulation has once taken place, and also upon the places of these changes.

This basis for judging should naturally be correct under the condition that the tubercle bacilli, which have once entered the blood circulation, are either deposited in the muscles or continue to circulate in the blood with retained virulence.

Now investigations during the last years have clearly and distinctly shown that the muscles and the blood of tuberculous animals are, as a rule, free from tubercle bacilli even in such a case where distinct signs of the generalizing of the tuberculosis were evident, contradictory to what has been said before. On the other hand, several investigations have shown that any tubercle bacilli which have entered the blood cannot generally be found there longer than eight to nine days at the utmost after the inoculation.

The signs of generalization are, therefore, not so much to be considered as a proof of the blood, and thus also the meat containing tubercle bacilli, but more as a proof, that in the organism can be found one or several centres of tubercles of such a propensity, that for a longer or shorter time back they had caused the generalization of the tuberculosis. It is therefore the duty of the practising meat inspector, after having ascertained the presence of tuberculosis with signs of generalization to endeavour to find the source which has caused the generalization, and also to make sure if any tubercle bacilli continuously escape into the main blood circulation and consequently infect the carcase. I believe that it is hardly possible to ascertain this in every case. However, we must through very numerous experiments intended to ascertain by various forms of tuberculosis, if the blood or the meat contains tubercle bacilli, come quite near the truth, and in this way obtain a better regulative for judging of tuberculous meat than that used up to the present. In the latest veterinary literature we see several investigations with the purpose of clearing up which forms of tuberculosis are intending to continually let out tubercle bacilli in the main blood circulation, as those of Bongert, Nieberle, Ishiwara, and others.

However, most of them have not tried to solve the question to the fullest extent, but have been satisfied with investigating the one or the other form of tuberculosis and their propensities. For that reason, in the endeavour to lay before you my views with regard to the judging of tuberculous meat, I principally base myself upon the results of the investigations which, during the years 1912-13, have been made by my colleagues Wall, Hülphers, and Brandt in the laboratory of the public slaughter-house of Stockholm. In the yearly report for the said years of Stockholm's slaughter-house detailed descriptions are given of these works, whose results form the basis of the new regulations for judging the meat with tuberculosis issued by the Royal Board of Medicine in Sweden.

The 153 investigations which have been made comprise carcasses of full-grown cattle, calves and pigs with tuberculosis of various form and extent, and have been executed in the following way. From the right anti-ventricle of the heart, left ventricle of the heart, or from the axillary vessels, in most cases 2 c.cm. of blood were under the precaution of sterilizing sucked

up through a suction pipe, and in order to avoid coagulation mixed with the same volume of 1 per cent. natrium citrate bouillon. This mixture is then injected subcutaneously on two guinea-pigs, each the half. After six or seven weeks they were tested with tuberculin in one of the footsoles, and those who reacted were killed. When both inoculated guinea-pigs showed negative reaction, one of them was killed for the purpose of a *post-mortem* examination. If through this examination tuberculous changes were to be pointed out, microscopic spread preparations were continuously made, and only after tubercle bacillus having been discovered by colouring per Ziehl-Neelsen the diagnosis of tuberculosis was cast.

Out of the twenty-seven cases of tuberculosis in cattle which were investigated during the year 1912, in ten cases the blood contained tubercle bacilli (= 37 per cent.). In three cases the blood from the right anti-ventricle of the heart was used as inoculating matter, out of which one case of highly developed tuberculosis of the lungs and liver combined with centres of the size of a pea in one kidney gave positive result. In four cases of highly developed tuberculosis of the lungs inoculation was made with blood from the axillary vessels, and in two of these cases one of the guinea-pigs was tuberculous. In the one case it was a matter of highly developed acute miliary tuberculosis of the lungs, together with tuberculosis of the pleura and peritoneum, but without signs of generalization. In the other case it was a chronic caseous pneumonia, together with highly developed tuberculosis of the pleura and peritoneum, combined with tuberculosis of the liver. In twenty cases of highly developed tuberculosis of the lungs the blood from the left ventricle of the heart was used as injecting matter, and in seven of these cases the result of the injection was positive, out of which in one case it was a matter of highly developed acute miliary tuberculosis in the lungs and kidneys; in three cases there was a widely extended chronic caseous pneumonia with tuberculosis of the pleura and peritoneum, together with signs of generalization in the kidneys or the udder; in three of the positive cases the tuberculosis was a local extended caseous pneumonia; in two of the cases, combined with tuberculosis of the pleura. Out of the thirteen cases where the injections with blood from the left ventricle of the heart were negative, it was a matter of one case

of highly developed acute miliary tuberculosis in the lungs with highly developed tuberculosis of the liver, combined with tuberculosis of the pleura and peritoneum. In three cases there was an extended chronic caseous pneumonia with signs of generalization in the kidneys or bones combined with tuberculosis of the pleura in two cases. In seven cases it was a matter of local tuberculosis with extended chronic caseous pneumonia, combined with extended tuberculosis of the pleura in six cases and of tuberculosis of the liver in one case. In two cases finally there was a slight caseous pneumonia, combined with tuberculosis of the kidneys in one case.

In all the investigated cases the tuberculosis produced centres varying in size and age, and frequently with uneven jagged edges.

In five of the ten cases with positive results of injection the tuberculous centres were hard and calcinated, whilst the others produced so-called soft centres, so that the latter cases cannot be regarded more than the other forms of lung tuberculosis spoken of, that the blood contains tubercle bacilli.

The investigations made in 1913 gave a positive result in a less number of cases than the researches of 1912, and its explanation is possibly that in the latter year, as a rule, the blood of the heart has been used as material of investigation, whereas in the former it was the blood from the axillary vessels which, as known, contains a mixture of arterial blood with venous blood, this being prevalent in a greater degree. It may be possible that a number of the tubercle bacilli, which the heart-blood contains, will be deposited in the capillaries of the extremity, so that the blood of the axillary vessels, which to a greater extent consists of venous blood, contains a smaller number of tubercle bacilli, and that consequently only the infections of a high degree give positive result. As the results obtained are intended to serve as a basis for judging the fitness of meat for human consumption, it must be only the serious cases which we have to look for. Researches of Findel, Reichenbach, and Alexander have, as known, proved that a far greater quantity of tubercle virus even in so susceptible an animal for tuberculosis as a guinea-pig is required to produce tuberculosis by feeding than it is by subcutaneous injection. Under such circumstances the blood of the axillary vessels, supposing that it contains a smaller number of bacilli than the blood

from the left ventricle of the heart, must be more suitable as material of researches, because a positive result through the weaker blood-infections, which are certainly harmless, is in this way to be avoided.

As the tables of the inoculations with the axillary vessel blood of cattle show, the tuberculosis has shown signs of generalization in meat lymphatic glands in thirty-two cases and such in the bones in eleven cases, but in no case the material of investigation was tuberculous. In thirty-one cases with tuberculosis of the pleura in a slight degree the material of inoculation was not tuberculous. In forty-two cases the tuberculosis of the pleura was of a high degree, and out of these seven ($= 16.67$ per cent.) gave positive result of inoculation. In three out of these cases the animals were in bad condition. Eighteen cases of tuberculosis of the liver gave negative result. Out of seven cases of tuberculosis in the substance of the udder two, or 28.57 per cent., showed positive result of inoculation. In both cases two fourth-parts at least of the udder were attacked. Out of fourteen cases of tuberculosis of the kidneys of a slight character the material of inoculation was tuberculosis in one case ($= 7.14$ per cent.). Six cases of tuberculosis of the kidneys of a high degree showed a positive result in three cases, or 50 per cent. Out of these cases two showed in the substance of the kidneys numerous centres smaller than a hemp seed.

Out of sixty-eight cases with tuberculosis in the lungs of a slight degree four, or 5.88 per cent., gave positive result. The lung tuberculosis was of a high degree in thirty-two cases, and three, or 9.38 per cent., of them were positive. Eighty-three cases, the animals being in good or second-rate condition, gave positive result in four cases, or 4.82 per cent., while fourteen cases, the animals being in poor condition, showed material of inoculation carrying tubercle bacilli in three cases, or 21.43 per cent.

As a general judgment it may be said that these researches, as well as the most of other authorities in the later years, show that it is only the cases of a more highly developed tuberculosis, which must be considered as the producer of blood and meat containing tubercle bacilli. Indeed, the one under No. 11 described case with a positive result of inoculation with the blood of the axillary vessels of a calf with extended tuberculosis of meat lymphatic

glands, but without tuberculosis in the substance of an inner organ, makes an exception. Where the reason for the infection of the main blood circulation in this case is to be looked for is impossible to say.

Amongst the various forms of tuberculosis, it seems that it is especially the more serious acute forms of tuberculosis of the lungs and of the kidneys and, perhaps, even of the udder, which seem to indicate that the blood contains tubercle bacilli. So the tuberculosis of the lungs must be considered as being acute in a high degree if the larger part of the substance in both lungs are full of close sitting centres in size of a hemp seed or smaller, or if, as to pigs, the substance of the lungs to the volume of at least twice the heart lobe in grey and indurated without caseous centres being noticeable to the naked eye, but, if such are visible, they are not larger than a hemp seed. The tuberculosis of kidneys must be considered as being acute in a very high degree, if numerous centres in size of a hemp seed, or smaller, are present in the substance of the kidneys. However, I do not consider that these forms of tuberculosis are alone sufficient to give a reason for the judgment of meat of a strict nature, as they do not in any way indicate the blood in every case of such a tuberculosis being the carrier of bacilli. If, however, highly developed tuberculosis of the lungs or of the kidneys is combined with tuberculosis in a high degree of the udder or tuberculosis of bones, of joints, or of the meat lymphatic glands, showing that the blood has really been the carrier of tubercle bacilli, there is every reason to suppose that the infection of the blood is without doubt continuously recurring, and then we are quite justified in preventing the meat with such tuberculosis changes being sold. The meat, however, of an animal in good or second-rate condition can be sold under the declaration, Freibank—of bearing the safety-stamp or any other mark of the hygienic inferiority of the meat after it has been sterilized and the organs and the affected parts have been thrown out. Even the highest developed forms of tuberculosis—emaciation not being present—do not prevent the meat being fit for human consumption after such a treatment as aforesaid. Such meat offers to all certainly no danger with regard to tuberculin to men.

If the tuberculosis is accompanied by emaciation, then, in any case, the meat is to be considered as unfit for human consumption,

and must be thrown out, no matter whether the tuberculosis is highly developed or not.

I come finally to the question, what we must do with regard to judging of organs with tuberculosis. I wish to remind you that the researches which have been made for the purpose to ascertain the presence of tubercle bacillus in tuberculous organs, in the most cases have shown bacteria even in such a case, where it was a matter of tuberculosis only in the lymphatic glands belonging to that organ. On the other hand, it is clearly proved that if tuberculous changes have been ascertained in an organ lymphatic gland, we never can be sure that there are no tuberculous centres in the substance of the organ. Under such circumstances every organ, as well as the corresponding lymphatic glands, as it will certainly be understood, must be considered as being unfit for human consumption as soon as tuberculous changes in either the organ itself or in its lymphatic glands have been ascertained.

From what I have said above, and also taking in consideration the researches made in Stockholm's public slaughter-house, I consider that we, in determining the safety of the carcases and the organs of tuberculous animals for human consumption, must adhere to the following principles, which are almost identical to the regulations recently established for that purpose by the Royal Swedish Board of Medicine:—

(1) Only the tuberculously changed organs or parts can be considered as being unfit for human consumption, when Nos. (2) or (3) are not applicable. An organ is to be considered as being tuberculous, if tuberculous changes are ascertained in either the substance of that organ or in the lymphatic glands belonging to it.

(2) As unfit for human consumption must the carcase as a whole be considered (meat, bones, fat, intestines, and blood) of an animal with tuberculosis combined with emaciation.

(3) The carcase of an animal as a whole may be considered as being safe for human consumption after being sterilized, and after the destruction of the organs and of the changed parts in cases of:—

(a) No calcinated tuberculous changes in three or more meat lymphatic glands in different fourth-parts.

(b) No calcinated tuberculous changes in a meat lymphatic gland, combined with highly developed acute tuberculosis of the lungs, or highly developed acute tuberculosis of the kidneys.

(c) Tuberculous changes in one bone or more, or in one joint, or in more, combined with highly developed acute tuberculosis of the lungs or highly developed acute tuberculosis of the kidneys.

(d) Highly developed tuberculosis of the lungs combined with highly developed acute tuberculosis of the kidneys or of the udder.

Clinical Articles.

REPORTS OF CASES TREATED WITH POLYVALENT SERUM.

BY MONSIEUR L. CUVILLIER.

Alfort Veterinary School, Paris.

Case 1.—Chestnut mare, 5 years old.

February 4.—The animal was sent to us. The four limbs, but more especially the posterior ones, were tumefied and œdematous. The voluminous swellings reached up to the elbows and thighs. The pituitary and oculary mucosæ were covered with petechiæ. There was no œdema of the face. The animal moved with difficulty on account of the restraint to the play of the articulations. Temperature, 38·9° C. The animal was isolated in a box in the infirmary. Anarsarca was diagnosed.

Treatment.—Bicarbonate of soda 30 grm., sulphate of soda 30 grm., calomel 1 grm.

February 5.—No change. Animal depressed; sulks at food. Temperature, 40° C. Same treatment as the day before, with the addition of 25 grm. salicylate of soda.

February 6.—The mare was downcast. The swellings more voluminous; the right hind limb moved like an inflexible post. Slight muco-purulent and sanguineous discharge from the nostrils. Petechiæ increasing in dimensions. The general condition aggravated. Temperature, 40° C. Same treatment without the calomel.

From February 7 to 24 little change. Swellings always extensive. Animal less depressed. Appetite all along capricious. Fever diminished. Extremes varying between 39·1° and 38·2° C.

February 25.—General state about same. Appetite better. Ecchymoses of the pituitary partly gone, but on two faces of the right hind limb gangrene of the skin involving the front of the hock and the lower part of the shank. The wounds were treated with warm antiseptic solutions and dusted with boric acid. Internal treatment the same.

February 26.—The wound of the right hind limb increased in length, width, and depth. Exudation of stinking pus permeating

the box with a bad smell. Gangrenous wound on internal face of left hock. Same treatment.

March 3.—Wounds increased in size. At the level of right hock solutions of continuity communicate. The animal in attempting to lie down falls on the ground. Slings necessary to raise her. Appetite good. Temperature, 38.8° C. Locally, after cleansing with physiological water, some polyvalent serum (Leclainche and Vallée) was injected with a Pravaz syringe. The needle was directed into the depths of the depressions with a view to covering up as much as possible the mortified tissues with the serum. Externally the wounds were equally damped with serum. Afterwards they were covered up with a light layer of wadding. Same treatment internally, repeating the calomel.

March 3 to 6.—Little modification. Less smell, showing the pus to be less infected. No change in aspect of the pus, but a little less in amount. Same treatment.

March 7.—Wounds no longer suppurate. Tissues react freely, have become rosy, and are covered with little buds of cicatrization. Swellings of the limbs diminished. Same treatment.

March 8 to 12.—Assisted regular cicatrization. Swellings of limbs less by one-half. Internal treatment discontinued. Same local treatment.

March 13 to 15.—Animal out of danger. Appetite normal. No fever. Lies down and gets up. Swellings of limbs disappeared. Wounds completely cicatrized. No anfractuosités and depressions on the right hind limb. A small wound on its internal face the size of a two-franc piece. On the external face wound diminished by half, only 5 cm. long and 3 to 4 cm. wide.

March 16 and following days wounds cleaned and dusted with dry pulverized polyvalent serum.

March 20.—Mare returned to battery, as she was considered cured. We saw her again on several occasions. Cicatrization terminated normally.

Case 2.—Black mare, 9 years old, one of a team.

Seen on February 19, 1915, the animal showed on the upper edge of the neck a handsbreadth in front of the withers a complete division of the skin and deep subjacent tissues to the depth of 4 to 5 cm. This mare had got a cord over her neck and, dragging back on it, had caused the wound mentioned. The two

surfaces of the wound were covered with dry exudate, bleeding in some places. Some shallows enclosed clots of blood beginning to suppurate. All the region inflamed and painful.

Treatment.—Careful disinfection of the wound with a warm solution of potassium permanganate 1 in 1,000.

February 20.—Swelling and suppuration of the region increased. Wound treated with a warm solution of sublimate 1 in 1,000.

February 21.—No improvement. Some bits of mortified tissue removed. Neck moved with difficulty. Animal eating well.

February 22 to 24.—The state of the wound aggravated. Abscess formation commencing above the wound. Appetite lost. Temperature, 39° C. Wound disinfected twice daily with different antiseptics: solutions of sublimate 1 in 1,000, pot. permang. 1 in 1,000, oxygenated water, 1 per cent. cresol. Painful region smeared with basilicon ointment.

February 25.—State aggravated. Pus in the abscess evacuated. Injected cavity with pot. permang. solution, which escaped into the wound below. Temperature, 39.4° C.

February 27.—Leclainche and Vallée's serum used. After washing with physiological water, injected the fistulous tracks with an ampoule of 5 c.c. of serum. Another 5 c.c. of the serum was spread equally over the original wound. With a view of allowing a longer contact of the serum with the morbid tissues, the solutions of continuity were at the same time protected with a thin layer of hydrophile wadding.

February 28, March 1 and 2.—Same treatment repeated, swelling disappearing, flow of pus declining, so that on March 2 it was almost negligible.

March 3 and 4.—Wound healing; neck moved freely. Same treatment on both days.

From March 5 to 10 wound attended to daily. On March 10 only a slight wound, filling up, and about 4 cm. long and $\frac{1}{2}$ cm. wide. Animal returned to the battery.

On March 11 and following days wound dried and dusted with dry and powdered polyvalent serum.

March 18.—Animal completely cured.

Case 3.—Light roan gelding, 6 years old.

February 25.—The animal was shown to us on visiting. Behind the withers, at the level of the dorsal spine, there was

a wound of the following dimensions: 10 cm. long and 4 cm. wide. This solution of continuity was due to the bad fitting of the surcingle holding the rug on the animal.

Pus, which ran away copiously, was of a bad character, yellowish-red in colour, and contained particles of mortified tissue. The edges of the wound greyish, no granulating. The centre greyish-green. All the region swollen, hot, and painful. The supraspinous ligaments and apophysis of a vertebral spine could be seen with the aid of a grooved probe. The wound was treated with the polyvalent serum, after cleaning with physiological warm water, by means of local application of the serum and the application of layers of hydrophile wadding.

From February 26 to March 10 the wound was treated exclusively with the serum, and all swelling, pain, and pus formation gradually declined. On March 11 the serum was discontinued, and a solution of 1 per cent. picric acid used as a keratinizing agent.

March 15.—Only a cicatrix at the wounded place. Animal discharged for service.

Case 4.—Chestnut mare, 8 years old.

March 9, 1915.—Suppurating wound on the withers 5 cm. long and 3 cm. wide. All the region painful and swollen. After bathing with warm water points of necrosis could be seen. Tissues atonic, no granulation. Pus flowing from the wound abundant, thick and yellowish. After cleaning the wound with physiological water polyvalent serum was applied, and the wound covered with a thin layer of hydrophile wadding.

From March 10 to 29 the wound was treated daily with the serum and gradually improved, as evidenced by lessening of pain, swelling, and pus formation. Dusted with dry serum on the 20th, the animal was discharged cured on March 25.

Case 5.—A chestnut bay mare, 6 years old.

March 20 the animal showed a contused suppurating wound the size of a two-franc piece behind the withers. Immediately in front of this was a gangrenous piece of skin in process of elimination. All this region was swollen, hot, and painful. After cleaning with salted warm water polyvalent serum was introduced, and a thin layer of wadding put on as a cover. The wound did well with serum treatment up to March 26.

March 27.—Large fleshy buds appeared on the surface of the

wound. These were excised, and the wound dusted with alum and sulphate of copper powder.

March 29 to April 5.—Cicatrization finished. The wound powdered with dry serum.

April 6.—Discharged cured.

Case 6.—A bay saddle gelding.

This gelding had a dry gangrenous patch of skin on the withers the size of a five-franc piece which was sloughing at the edges. The region was painful, hot, and swollen. The lesion was due to excessive and prolonged saddle pressure. To facilitate the elimination of the dead part all the area was dressed with camphorated ointment. By continuation of this treatment the sitfast came away on March 30, and the resulting purulent cavity was dressed daily with the serum up to April 7. On April 8 the wound was powdered with dry serum, and on April 12 the animal was discharged cured. Naturally, the saddle pressure had to be remedied.

Case 7.—Dappled grey mare, 7 years old.

March 29.—Showed a wound behind the withers caused by pressure of the surcingle on the dorsal spines. A dry and dead piece of skin removed caused much pus to flow away. The wound was cleaned and camphorated ointment applied.

On March 11, after cleaning the wound with physiological water, two fistulous tracks were found on each side of the withers 6 cm. long and not communicating. Pus streaked with blood flowed away. The openings of these fistulas were enlarged, their tracks cleansed thoroughly, and they were injected with 9 per 1,000 salted warm water. After drying they were injected with polyvalent serum, and the external wound also dressed and the wound covered with wadding.

March 12.—Suppuration intense. Wound cleansed with salted water showed improvement. The pus discharged from the wound and the fistulas was grumous, flocculent, and contained much mortified tissue. From March 12 to the 19th the fistulas and wound were treated with the serum, and after dusting with dry serum until March 24 the mare was able to resume duty.

—*Revue Générale de Médecine Vétérinaire.*

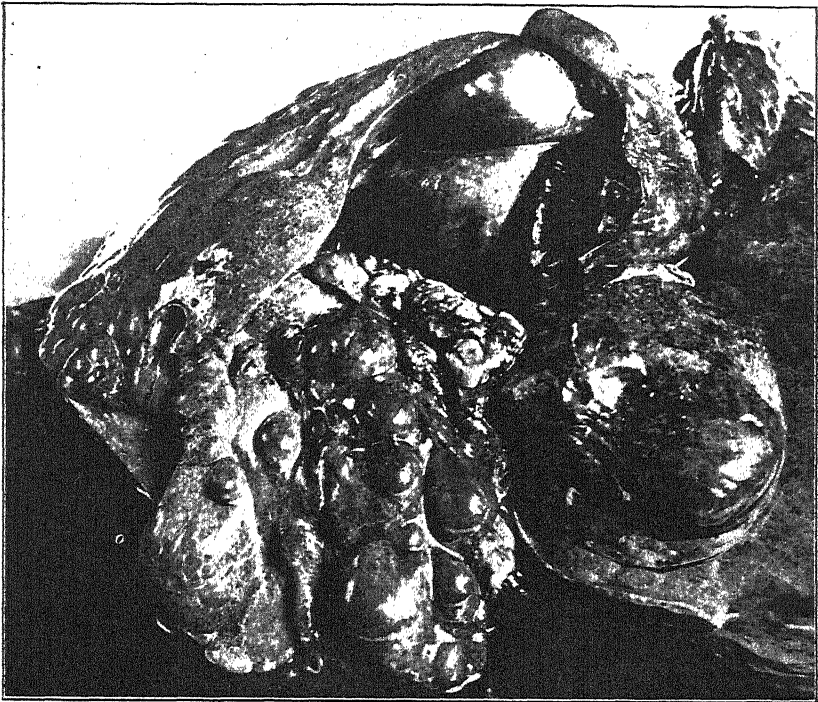
G. M.

HYDATID DISEASE IN A DOG.

By H. A. REID, F.R.C.V.S.
New Zealand.

AN aged collie dog was brought to me by a farmer with the history that the animal had been suffering from obstinate constipation, a condition which the administration of enemata and free dosage with castor oil had failed to relieve.

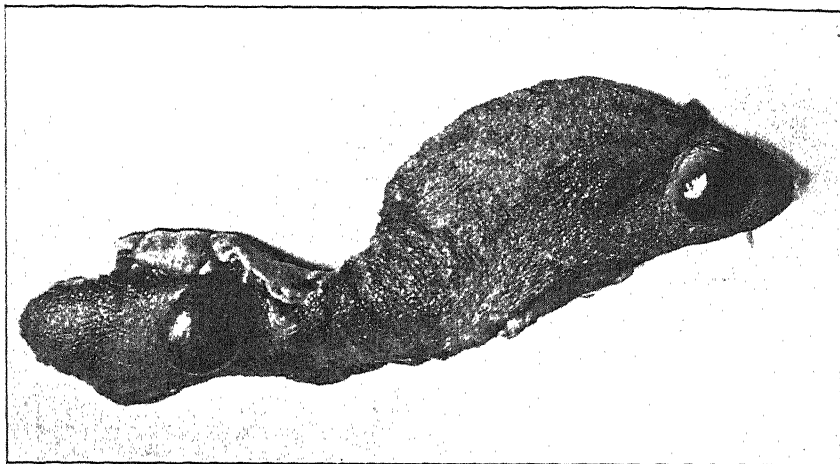
Examination showed the abdomen to be much distended, and palpation of the abdominal wall determined a condition of



Liver with *E.* cysts.

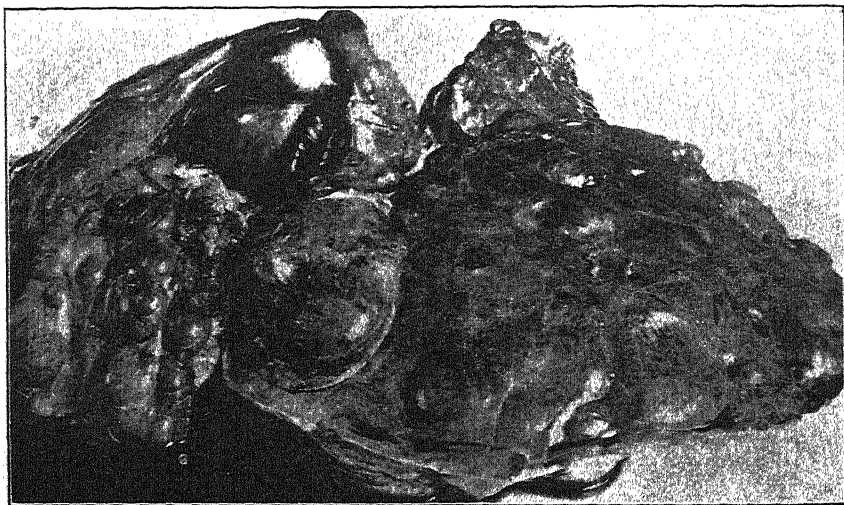
ascites. Respirations and pulse were slightly accelerated. There was no jaundice.

Prognosis was doubtful, the owner being informed that the dog was probably suffering from chronic liver disease resulting in serious embarrassment to the vascular system. At his urgent request treatment was undertaken. The constipation was overcome by a dose of aloin 1 dr. and calomel 3 gr. Subsequently calomel 2 gr. every third day and iodide of potash 5 gr.



Spleen with *E. cysts*.

twice daily were administered. The abdomen was tapped, and about two quarts of sero-sanguineous fluid drawn off. This operation afforded evident relief. The dog, which had previously refused all food, soon recovered his normal appetite, and appeared to be making fair progress. Within a week the dropsical transudate again began to accumulate. The animal



Liver with *E. cysts*.

became extremely emaciated, and finally died from exhaustion. *Post-mortem* examination revealed a very interesting condition.

The liver was enlarged, weighing 3 lb. 9 oz., the gall-bladder being greatly distended. The liver was the seat of very extensive infection by *Echinococcus polymorphous*. The spleen also contained two echinococcus cysts. The remaining organs appeared to be normal.

On opening the bowels numerous specimens of *Tænia marginata* and *Dipylidium caninum* were seen, and on close scrutiny after immersion in water a number of *Tæniæ echinnococci* were discovered.

Although hydatid disease from infection by *Echinococcus polymorphous* is known sometimes to occur in dogs, the condition is sufficiently uncommon to deserve mention.

THE DISEASE KNOWN AS "EVIL" IN SHEEP, AND ITS TREATMENT BY AUTOGENOUS VACCINES.

By J. F. D. TUTT, M.R.C.V.S., F.R.M.S.

Winchester.

BEFORE proceeding it is necessary to make it quite clear to the reader that the name "Evil" has nothing whatsoever to do with joint evil, the lesions being exclusively on the head and neck, and, further, it occurs in adult sheep.

The writer has been unable to find any reference to this disease amongst recent veterinary literature, and search amongst older works has been barren of result with one exception. This is the more remarkable, as this complaint is well known to agriculturists, and it appears to be not so well known to the profession as it should, due, no doubt, to the fact that the sheep and its ailments has not been given the attention it deserves.

J. H. Steel, in his treatise on "Diseases of the Sheep," 1890, p. 65, says: "There is the disease vulgarly known as 'Evil,' described by Spooner as a hard swelling of the submaxillary glands, succeeded by small pustules on the head and neck, which break and discharge white matter, perhaps being succeeded by a second crop, almost uniformly fatal by its constituting a drain on the system, but occasionally benclited by iodide of potassium internally, and iodide of mercury externally. We must leave to

future research to determine what is really the nature of this condition."

The symptoms shown by the sheep (in lamb ewes) that came under my notice some little time ago were as follows:—

There was marked swelling of the nose, with pimple-like elevations containing pus of the "laudable" type.

Breathing was naturally interfered with and was noisy and "jerky." There was no discharge from the nose itself, and there was no evidence of stomatitis; the general condition did not appear to have suffered much, and the appetite on the whole was normal.

Some fresh pus was obtained from a pustule and forwarded to the Runcorn laboratories, where an autogenous vaccine was prepared from the following organisms which were found to be present:—

- (1) A diplococcus.
- (2) *Staphylococcus albus*.
- (3) A club-shaped bacillus.

Each cubic centimetre of the vaccine represented 6,000,000,000 organisms, made up of 2,000,000,000 of each of the above-named organism.

Each sheep received as an initial dose $\frac{1}{2}$ c.c. At intervals of six days the dose was gradually increased, until at the end each sheep received 30,000,000,000 organisms.

It required nine inoculations in all before recovery was complete.

Previous to seeking professional advice the owner had tried an "Evil" mixture, consisting chiefly of sulphur, without any success.

SUCCESSFUL TREATMENT OF A CASE OF CHRONIC DIARRHŒA IN THE HORSE BY THE USE OF A STOCK VACCINE OF THE *BACILLUS COLI*.

By J. F. D. TUTT, M.R.C.V.S., F.R.M.S.

Winchester.

THE subject was a bay riding gelding, and it had suffered from the complaint for some months past. All the known medicinal remedies had been tried, but were useless in arresting the disease, and on being seen the animal was very emaciated; the appetite was excellent. The diarrhœa was not unlike that observed in cases of Jöhne's disease in bovines. No intestinal parasites could be detected. Reaction to the tuberculin test was negative.

A stock vaccine of the *Bacillus coli* was obtained from Messrs.

Parke, Davis and Co. in tablet form, each tablet representing 500,000,000 of colon bacteria.

For the first two inoculations, which were given at an interval of four days, one tablet was given. It was then increased to two tablets every three days for a period of six weeks, when the complaint had quite disappeared and the general condition had become normal.

There has been no sign of a recurrence after nearly a year has elapsed.

ARMY VETERINARY SERVICE.

(*Extract from "London Gazette."*)

War Office, Whitehall, August 12.

REGULAR FORCES. ARMY VETERINARY CORPS.

To be temporary Lieutenant: G. Sutton, F.R.C.V.S. Dated August 1.

August 13.

To be temporary Majors: Captain A. S. Head, Reserve of Officers; temporary Lieutenant F. T. G. Hobday. Dated August 14.

August 16.

J. D. Broome to be temporary Captain, and not as stated in *Gazette* of August 3.

August 17.

To be temporary Lieutenants: R. Colthurst. Dated July 17. F. J. Ahams. Dated July 20. M. J. Brett, G. K. Shaw, W. H. Heaney. Dated August 1. J. McLean. Dated August 2. J. Edgar. Dated August 4.

August 18.

Captain W. C. Quinnell, late Australian Forces, to be temporary Captain. Dated July 28.

To be temporary Lieutenants: S. Villar, F.R.C.V.S., T. Russell. Dated August 1. T. A. McC. Finch. Dated August 2.

Surname of temporary Lieutenant W. Lenton is as now described, and not as stated in *Gazette* of July 9.

August 14.

TERRITORIAL FORCE RESERVE.

Captain J. S. Channon, from Army Veterinary Corps (T.F.), to be Captain. Dated August 15.

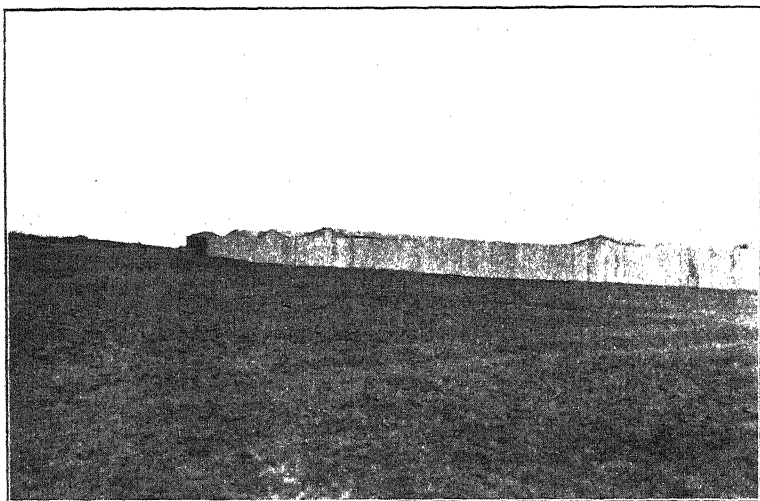
MEDITERRANEAN EXPEDITIONARY FORCE. ARMY VETERINARY CORPS.

The following casualties in the Mediterranean Expeditionary Force are reported:—

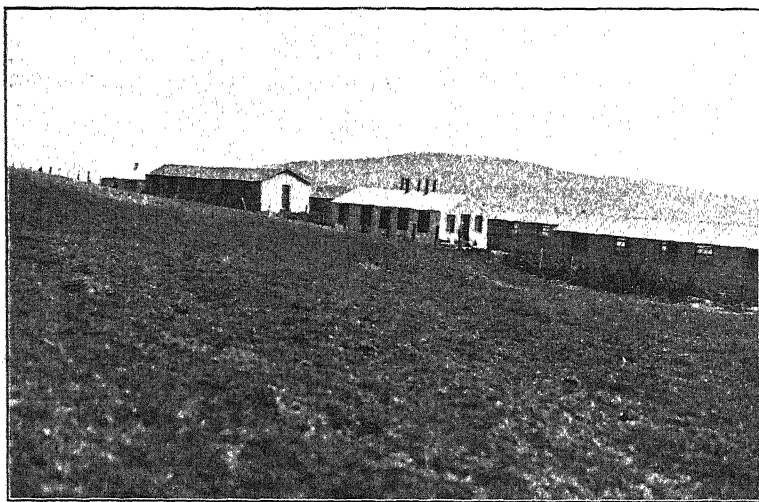
Wounded.—Private H. T. Beamon, 4166; Private W. M. Cooper, 3590; Wali Muhammad, Veterinary Jamadar, Supply and Transport Corps.

ORIGINAL VIEWS OF ARMY VETERINARY CAMPS
WITH THE EXPEDITIONARY FORCE IN FRANCE.

For the right to publish the following original and interesting photographic views of the work of the Army Veterinary Corps in France, we are indebted to Mr. George Monckton and to the proprietors of the *Illustrated London News*.



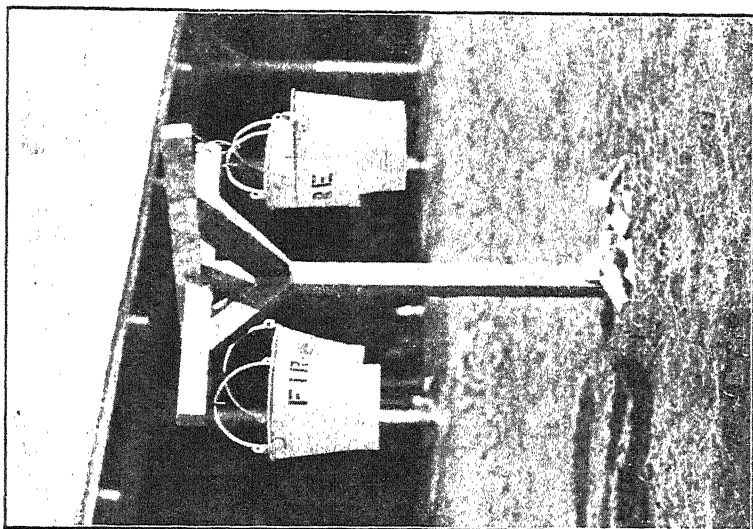
ARMY VETERINARY CORPS VETERINARY HOSPITAL.
Showing wind screen round avenues of stalls.



ARMY VETERINARY CORPS VETERINARY HOSPITAL.
General view of some of the buildings: the executive offices are on the right, the whiter buildings are some of the men's quarters.



ARMY VETERINARY CORPS VETERINARY CAMP.
A hopeless case.



ARMY VETERINARY CORPS VETERINARY HOSPITAL.
Showing system of fire protection. Numerous buckets on stands depicted
are placed at regular intervals along the avenues of stalls.

EXTRACTS FROM THE DIARY OF AN ARMY VETERINARY OFFICER AT THE FRONT IN FRANCE.

OCTOBER 14 TO DECEMBER 30, 1914.

Wednesday, October 14.—Reported arrival in France.*Saturday, October 17.*—Left for the Front.*Tuesday, October 20.*—Reached railhead. Reported to Divisional Headquarters. Attached to an infantry brigade. Left Divisional Headquarters at night by supply transport, and with an armed guard proceeded to Brigade Headquarters. Much firing heard during the journey. Sky illuminated by flashes.*Thursday, October 22.*—Headquarters under heavy artillery fire throughout the day. Windows shattered. Roof of neighbouring house destroyed. Several horses killed. Extracted shrapnel from two horses. Detected one case of strangles, and sent one animal to Mobile Veterinary Section. This evening neighbouring farms in flames. Spent a comfortable night on straw.*Friday, October 23.*—This village still under shell fire, shrapnel, high explosives, &c. Hospital adjoining damaged by shrapnel. Took refuge in cellar for some hours. Headquarters thinking of moving. Everybody standing to. Two aircraft over this morning. Germans have spotted our position. Village entirely deserted; a variety of animals wandering about.*Saturday, October 24.*—Headquarters Brigade moved during the night. Shelled from 4.30 a.m. Sunday for two hours. Message was received: "Germans broken through part of the line." Whole Brigade proceeded to search neighbouring woods, a bayonet charge followed, twenty-seven prisoners taken, and enemy put back with heavy loss. In charge of Brigade Headquarters transport. Inspected all Brigade horses, dressed wounds, and removed several splinters of shrapnel.*Monday, October 26.*—Heavy firing in distance all day. An English aeroplane five miles south of our position was seen in flames. Was brought to ground by our own men; both pilot and mechanic killed. Moved into fresh billet half a mile distant.*Tuesday, October 27.*—Visited one of my units after dark. Two stray bullets embedded themselves in door of C.O.'s billet while I was present.*Wednesday, October 28.*—Still in same billet. Found two cases suspicious of mange. Rode into neighbouring town of — and lunched there. Bomb dropped from German aeroplane, but no damage done. Frenchman went up in pursuit. I found a cow and got a pint of milk for tea.*Thursday, October 29.*—Big battle raging since midnight. Everyone standing to. Unable to visit all my horses.*Friday, October 30.*—Bombs dropped into—; bombardment commenced.*Saturday, October 31.*—Had four horses killed by shrapnel

during night of 30th. Two men were injured. Neighbouring chateau partly destroyed by shells. Several Staff officers wounded and some killed. Transport moved back four miles.

Sunday, November 1.—Billeted in a farm. Had a busy morning among my horses. Removed a bullet and several splinters of shrapnel.

Tuesday, November 3.—This village was shelled, one horse having been killed last night. Roads a network of shell holes. Evacuated six horses to-day as unfit for work; sixteen remounts received. Found a very emaciated horse (apparently French) and destroyed same.

Thursday, November 5.—Nothing of note has happened. Town still being bombarded. Four shells short range dropped into this village.

Friday, November 6.—Part of — in flames; bombardment continues with vigour; sky illuminated by flashes for miles around.

Saturday, November 7.—News on the whole satisfactory; expecting to move at midnight. Neighbouring village shelled.

Sunday, November 8.—Still in same billet. Less shelling. Quieter day. Very busy with veterinary work.

Monday, November 9.—The position does not alter; have already been here a week. New A.F.H. 2,000 issued to me to-day—white instead of blue.

Thursday, November 12.—Rode out to — to see horses and returned late; very dark night. The road took us within half a mile of German trenches.

Friday, November 13.—Very wet day. Guns quiet. Routine veterinary work.

Saturday, November 14.—Had message to attend machine gun horse in — Wood. Rode out in afternoon, found animal peppered with shrapnel, and destroyed same. The Germans whilst seeking our batteries (concealed by roadside) dropped shell 10 yards over my head, same not exploding.

Sunday, November 15.—Snowing hard and freezing. Brigade expecting to go back for relief. Still in same billet.

Monday, November 16.—Paraded all sick horses. Moved at night with Brigade transport to billets N.W. of —, on the outskirts of that town. Raining hard all day. Mud knee-deep; had much trouble with wagons, &c., in consequence. Town still under bombardment. Shells passing over our billets night and day incessantly, and falling into centre of town half a mile away.

Tuesday, November 17.—A beautiful day. Several horses injured as a result of last night's struggle in the mud. Pulled several out of ditches with drag ropes. New billet very comfortable—possesses a piano. We spend a happy evening in spite of shells.

Wednesday, November 18.—Nothing of note has happened. It was reported all bridges leading out of town were destroyed by shell fire. A reconnoitring party report all is well. We are going south for a short relief.

Thursday, November 19.—Snowing hard and freezing. Had a slight case of colic to-day—the first as yet.

Friday, November 20.—Left our billets N.W. of — at 3 p.m. for —, rested for two hours at midnight, fed and watered horses, &c. Continued our journey at 2 a.m. Arrived at — 6 a.m. next morning. Freezing hard throughout journey. Roads glazed with ice. Horses not roughed. Journey very slow. Much trouble with general service wagons.

Saturday, November 21.—Bomb dropped in — about 11 a.m. from German aircraft; damaged hospital. Killed one man, injured two. Horses billeted at various parts of the town.

Tuesday, November 24.—Two units of the Brigade take over a line of trenches for forty-eight hours. Prince of Wales and General French's Staff here to-day.

Wednesday, November 25.—Instructions to inspect and take over veterinary charge of a field ambulance.

Monday, November 30.—Reorganization of the Brigade is taking place. Eighteen remounts received to-day.

Tuesday, December 1.—Brigade standing to.

Thursday, December 3.—Brigade inspected by H.M. the King at 12.30 p.m. The King was accompanied by the Prince of Wales and his Staff.

Friday, December 18.—Found four suspicious mange cases. All confirmed. Much ringworm prevails.

Tuesday, December 22.—Left — at 6.30 p.m., and travelled with transport during night to —. Reached — 6.30 a.m. Transport was parked in square, horses fed, watered, &c. At 8 a.m. left — for small village near firing line. Raining hard all day; much mud. Met a Cavalry Division, much congestion resulted, and in consequence general service wagons, cookers, water-carts, &c., were left in ditches. Reached our destination at 6.30 p.m. on 23rd and were billeted.

Thursday, December 24 (Christmas Eve).—Inspected all horses of Brigade after journey.

Friday, December 25.—Routine veterinary work.

Monday, December 28.—Left this village at 5 p.m. Visited trenches with officer in charge of daily rations. Traversed whole line held by the regiment. Snipers at work all evening. Much volleying took place. Had supper in Headquarters dug-out, and arrived back at billet 12 p.m.

Tuesday, December 29.—Inspected all horses of a Field Company (R.E.) and of a Field Ambulance.

Wednesday, December 30.—Rode into —, and met other veterinary officers there.

Selections.

STOMACH TUBE AS A DIAGNOSTIC.

By WALTER LAWSON, D.V.S.

I HAVE autopsied seven cases in two months, and I find the stomach tube a reliable diagnostic agent. I have been using the tube for four years on every case, and as Dr. Knisely, Dr. Phillips, and Dr. Merillat state, it will cure any curable case without medicine. I have autopsied twenty-nine cases in four years, and, except one, death was certainly due to fermentation and gas formation causing rupture, twist or telescoping of the bowel.

If you inject five or six gallons of water into the stomach and get a return flow, you can depend on it that the stomach or small intestines are not ruptured. If there is no return flow and you can hear the water rushing along by putting your ear to the right flank, you may be sure the trouble is in the single or double colon. If after emptying the stomach the horse gets worse you may expect a death. In all of my cases the first treatment will prove the diagnosis. If a twist, rupture, or other incurable ailment, the animal will still be in pain after first using the tube, and you can tell the owner the outcome. Now, why should we want to use aloes, oil, eserine, or arecoline for such cases?

To start with, the trouble can be from nothing else than indigestion, the fermentation causing gas, and then the rupture, &c., soon follow. I use a handful of table salt and the same of borax in washing the stomach, leaving the same quantity with six or seven gallons of water in the stomach when cleansed. If from impaction of the double colon from alfalfa, I keep them full of water, injecting three or four gallons in the stomach every hour, hot water preferred. How that congested, inflamed, strained, sore gut is to perform its work until soothed and the soreness removed so that it can is a question. There is no treatment so healing, quieting, and soothing as hot water. Any case (as Professor Merillat says) that can be cured with cathartics, slow or swift, can be cured quicker with the stomach tube, and the patient will eat quicker than when treated with a lot of poisonous drugs.

I at first used the tube through the nasal route, but the clients

did not like the blood that we get sometimes, so I use it through the mouth and like it much better. I can use it through the mouth of a year-old colt. I do not need to tie so fast when using it through the mouth in passing the tube, as many times I pass it with the horse in a corral or lot, but I use the speculum one-half closed. Too wide open interferes with breathing.

Death from colic is terrible. A fine horse will go out in the morning, and the next morning is dead. What is the cause? My experience is it is gas. If this will benefit anyone or cause any new treatment publish it, as we will have colics as long as we have horses.—*American Journal of Veterinary Medicine.*

SENILE PARALYSIS.

By M. R. STEFFEN.

THIS is a condition which occurs with considerable regularity in old cows. In most cases it takes what may be termed a progressive form, starting with a stiffness in one hind leg. After weeks, sometimes months, a lameness develops in one hind leg, without any evidence of swelling or any localized area of soreness. About at this time it is noticed that the cow "cannot get up as well as she used to"; she seems to be weak in the posterior parts. Also about at this time she begins to look bad; does not thrive or keep in her usual good condition, although her appetite is apparently as good as ever.

Very soon after the trouble has reached this stage the cow becomes entirely unable to get up without assistance. This condition is confined to aged cows, and is never seen in cows under 9 or 10 years old.

Usually it is best in these cases to advise the destruction of the cow. While now and then one of these cases improves sufficiently under treatment to enable the owner to dispose of the cow in some other manner, it is usually a loss from a financial standpoint to attempt their cure.

The condition is seen both in cows which are in various stages of pregnancy and in cows which are barren. It seems, however, to run a more rapid course in pregnant cows.—*American Journal of Veterinary Medicine.*

PERSISTENT ANOREXIA.

By M. R. STEFFEN.

THIS seems perhaps an odd name. Anorexia, or lack of appetite, usually is only one of the symptoms of a disease. In the condition I am about to speak of, anorexia is the whole disease and the whole symptomatology.

These are aggravating cases for the veterinarian. To the owner the case appears very simple; the cow "just won't eat anything." Nothing else of an abnormal nature can be seen. Cases have been reported in which this inappetence or anorexia persisted for two weeks without any evidence of other disease or a sign upon which to base a diagnosis.

In my own experience I have never been able to make a definite diagnosis in these cases, and other experienced practitioners with whom I have discussed this subject make the same confession. The cow simply (and merely, and only and every other which way) will not eat. That is all. Examine her as carefully and as thoroughly as you can, and you disclose absolutely nothing else which will help you in diagnosis. For this reason I know of no better name for the condition than that of "persistent anorexia."

Because the loss of appetite is the only symptom, the owner usually does not call the veterinarian in until the case has been running along two or three days.

In any other cases than a case of persistent anorexia the cow would have developed more or less positive signs pointing to the nature of the trouble in such a period of time. In persistent anorexia, however, nothing has developed. The owner tells you she has not eaten for so and so long and she will not eat now. When you get through with your examination you know no more—first, last, and all the time "she simply won't eat."

The prognosis must be very guarded. The cow may begin to eat again very shortly after you have prescribed for her, and then again she may not come back to feeding for a week or more.

In my practice I have tried many different remedies for this condition. Until we discover the cause or the nature of this ailment our treatment will be more or less empirical, and to my knowledge the pathology in persistent anorexia has never been explained. My best results have come from agents acid in reaction; lately, I use dilute acetic acid, giving 2 oz. morning and evening for two or three days, with an equal amount of water.—*American Journal of Veterinary Medicine.*

DISEASES OF ANIMALS ACTS, 1894 TO 1914.

NUMBER OF OUTBREAKS AND OF ANIMALS ATTACKED OR
SLAUGHTERED.*Great Britain.**(From the Returns of the Board of Agriculture and Fisheries.)*

DISEASE	JULY				SEVEN MONTHS ENDED JULY			
	1915		1914		1915		1914	
<i>Anthrax—</i>								
Outbreaks	35	...	41	...	393	...	482	...
Animals attacked	50	...	51	...	451	...	522	...
<i>Foot-and-Mouth Disease—</i>								
Outbreaks	—	...	—	...	—	...	11	...
Animals attacked	—	...	—	...	—	...	74	...
<i>Glanders (including Farcy)—</i>								
Outbreaks	7	...	15	...	32	...	68	...
Animals attacked	20	...	70	...	59	...	212	...
<i>Parasitic Mange—</i>								
Outbreaks	124	...	123	...	*535	...	1,503	...
Animals attacked	271	...	157	...	*1,171	...	2,613	...
<i>Sheep-Scab—</i>								
Outbreaks	3	...	3	...	159	...	150	...
<i>Swine Fever—</i>								
Outbreaks	415	...	411	...	2,747	...	2,599	...
Swine slaughtered as diseased or exposed to infection	1,583	...	4,947	...	12,360	...	27,518	...

* Figures for four months only, the Parasitic Mange Order of 1911 having been suspended from August 6, 1914, to March 27, 1915, inclusive.

*Ireland.**(From the Returns of the Department of Agriculture and Technical Instruction for Ireland.)*

DISEASE	JULY				SEVEN MONTHS ENDED JULY			
	1915		1914		1915		1914	
<i>Anthrax—</i>								
Outbreaks	—	...	—	...	1	...	1	...
Animals attacked	—	...	—	...	1	...	1	...
<i>Foot-and-Mouth Disease—</i>								
Outbreaks	—	...	1	...	—	...	76	...
Animals attacked	—	...	2	...	—	...	957	...
<i>Glanders (including Farcy)—</i>								
Outbreaks	—	...	—	...	1	...	—	...
Animals attacked	—	...	—	...	3	...	—	...
<i>Parasitic Mange—</i>								
Outbreaks	8	...	6	...	44	...	55	...
<i>Sheep-Scab—</i>								
Outbreaks	14	...	28	...	268	...	375	...
<i>Swine Fever—</i>								
Outbreaks	22	...	26	...	162	...	142	...
Swine slaughtered as diseased or exposed to infection	87	...	69	...	910	...	712	...

PREVALENCE OF ANIMAL DISEASES ON THE
CONTINENT.

(From the *Journal of the Board of Agriculture*.)

THE following statement shows that according to the information in the possession of the Board on August 1, 1915, certain diseases of animals existed in the countries specified:—

Austria (on July 14).—Foot-and-mouth disease, glanders and farcy, swine erysipelas, swine fever.

Denmark (month of June).—Anthrax, foot-and-mouth disease (1,201 outbreaks), glanders and farcy, swine erysipelas, swine fever.

France (for the period July 4—17).—Foot-and-mouth disease, glanders and farcy, sheep-pox.

Germany (for the period July 1—15).—Foot-and-mouth disease, glanders and farcy, swine fever.

Holland (month of June).—Anthrax, foot-and-mouth disease (186 outbreaks), foot-rot, glanders, swine erysipelas.

Hungary (on July 14).—Foot-and-mouth disease, glanders and farcy, swine erysipelas, swine fever.

Italy (for the period July 12—18).—Anthrax, blackleg, foot-and-mouth disease (226 outbreaks), glanders and farcy, rabies, sheep-scab, swine fever, tuberculosis.

Norway (month of June).—Anthrax, blackleg, swine fever.

Rumania (for the period June 21—29).—Anthrax, foot-and-mouth disease, glanders and farcy, rabies, sheep-pox, swine erysipelas, swine fever.

Russia (month of March).—Anthrax, foot-and-mouth disease (50,278 animals), glanders and farcy, pleuro-pneumonia, rabies, sheep-pox, swine erysipelas, swine fever.

Spain (month of May).—Anthrax, dourine, glanders, pleuro-pneumonia, rabies, sheep-pox, sheep-scab, swine erysipelas, tuberculosis.

Sweden (month of June).—Anthrax, blackleg, foot-and-mouth disease (3 outbreaks), swine fever.

Switzerland (for the period July 19—25).—Anthrax, blackleg, foot-and-mouth disease (26 “*étables*” entailing 3,712 animals, of which 7 “*étables*” were declared infected during the period), glanders, swine fever.

No further returns have been received in respect of the following countries: Belgium, Bulgaria, Montenegro, Serbia.

THE ARTILLERY HORSE.

DO WE WANT A NEW BREED?

A CORRESPONDENT writes to the *Yorkshire Post*:—

"A feature of the horse purchasing transactions of the War has been the eagerness of Government buyers to secure the gunner type of horse found on many Lakeland fell farms. These animals, which represent perhaps two-thirds of Clydesdale blood on a fell pony foundation, are stoutly built, run from 15 to 16 hands high, and it is claimed they are more active and enduring, and can maintain their condition on less food than the pure Clydesdale or Shire. They make excellent artillery horses, and it is noteworthy that England, the stud farm of the world, has no pure breed that fulfils all requirements as a gun horse, the heavy breeds being too sluggish and the light breeds too light. As three or four horses are required for the artillery and transport for one for the cavalry, this points to the need of a new breed.

"The type preferred by the artillery officer is the heavy-weight hunter—an animal who may be described as the battle cruiser of the horse world, a maximum combination of speed and strength, uniting much of the power of the Shire with much of the fleetness of the racer. The English 16-stone hunter is probably the most useful all-round, general utility horse in the world; he is good for the gun, and the plough, as the saddle. What is generally overlooked is that it is hopeless to expect a general revival of light horse breeding in England, unless the breed is strong enough to earn its keep at farm work. When an old heavy-weight hunter finds his way, through accident or old age, into a farm team, he will be found to out-foot, out-work, and out-stay the more ponderous Shire or Clydesdale, and, walking easily a mile an hour faster than the two breeds named, he proves the most economical horse on the farm.

"The researches of Mr. Smith Hill, Principal of the Aspatria Agricultural College, have shown that fifty years ago the favourite horse on Cumberland farms was the half-bred, which was preferred because of a superior activity, but since then the profitable market for town horses has led to the Clydesdale coming into general use. The creation, therefore, of a new breed of artillery horses of the heavy-weight hunter type would be an advantage, not only to the Army, but to agriculture.

"It may be noted, in this connection, that the Irish draught horse, the Pembrokehire cart horse, and the Devonshire pack horse—old breeds which, with the support of the Irish Department of Agriculture and English Board of Agriculture, it is sought to revive—are all better adapted to artillery work than the Shire, the Clydesdale, and the Suffolk."

 SALE OF ARMY MARES.

WITH a view of encouraging and assisting the breeding of light horses, the Board of Agriculture and Fisheries have been authorized by the War Office to arrange for the sale of some mares which have been returned from abroad as no longer suit-

able for use with the Expeditionary Force, and which have been specially selected by the Board as of types suitable for breeding purposes.

The mares will be sold by public auction, on the express condition that they are not at any time to be exported out of the country. To secure observance of this condition the mares will be branded with a distinctive mark of diamond shape.

The mares have passed the mallein test for glanders to the satisfaction of the Board's veterinary officers, but no guarantee is given as to their age, soundness, or otherwise. They can be examined prior to disposal at the places of sale by veterinary surgeons on behalf of intending purchasers. The mares can be seen at the cattle testing station, Pirbright, Surrey, by arrangement with the inspector in charge.

Review.

Table of Veterinary Posology and Therapeutics for Students and Practitioners. By G. A. Banham, F.R.C.V.S., and William J. Young, F.R.C.V.S., D.V.S.M. Vict. Foolscape 8vo, pp. xvi + 272. Messrs. Baillière, Tindall and Cox, 8, Henrietta Street, Covent Garden, London, W.C. 1915. Price 3s. 6d. net.

This is the fourth edition of a little book which is to be found in almost every veterinary surgery, and which is well known to all students and practitioners. In the compilation of this edition the author has had the help of well-known members of the profession, and the volume benefits by their co-operation. Messrs. A. W. N. Fillers, F.R.C.V.S.; Henry Gray, M.R.C.V.S.; J. S. Lloyd, F.R.C.V.S., D.V.S.M.; and Sir John M'Fadyean have all assisted with material or suggestions.

Many additions have been made to the contents of previous editions, and they all add to the usefulness of the handbook. The most acceptable further pages appear to be those dealing with the percentage composition of feeding-stuffs, table of comparative anatomical weights, capacities and measurements, table of drugs excreted by the mammary gland, table of names given to horses, cattle, sheep, and pigs according to age and sex. To the man whose lot is cast in different parts of these isles these names will be a godsend. We know from experience that local nomenclature has often befogged us more than the diagnosis of disease. The section might have been extended to include the explanation of such terms as "the yellows," "farcy," "a shake," &c.

The posological section of the work is as satisfactory and more extensive than ever, and although we notice the omission of such useful drugs as protargol and argyrol from the list, yet we find acetanilide, hydrogen peroxide, and liquid paraffin included.

We should have liked to see the subcutaneous method of medication gone into more fully and the doses given more exactly than by recommendation of a $\frac{1}{10}$ part of the oral dose, which in

many cases would be right, but in others somewhat awry. For instance, if we take veratrine the subcutaneous dose for the pig would be $\frac{3}{16}$ gr. to $\frac{1}{2}$ gr., whereas the proper dose is $\frac{1}{4}$ gr. to $\frac{1}{2}$ gr. Other examples of wrong guidance (if the direction given is accepted) in the case of subcutaneous dosage might be cited. In looking over the list of diseases and their remedies, we have wondered whether such a condition as "pica" still exists. A few days ago we consulted the little work on this subject, but could not find any mention of the ailment.

We know the weary monotony attached to the reading of proofs, but are inclined to think that this operation is not as carefully done as in past days. Even with a rather extensive list of errata given on p. xiv it grates on us to find such words as *Pneumuonia* on p. 134 and *testicles* on p. 230. The duration of heat in the sow is given as two to four days; if this is an average, we think the mean is nearer two days than two to four. The number of mares allowable to a stallion needs qualifying as regards breed and age. We are rather surprised that such terms as "barrow" and "jointer" are not included in the list of names given to pigs.

Apart from these minor criticisms we have nothing but praise for the little work. Its compilation must have necessitated much reference, research, and tabulating. It is a reliable, complete, and handy companion for the veterinary surgeon and student in the moments occupied in fitting the remedy to the disease.

G. M.

Obituary.

WIRKL.-GEHEIMRAT PAUL EHRLICH.

*Director of the Royal Institute for Experimental Therapy,
Frankfurt-am-Main.*

THE death is announced of Professor Paul Ehrlich, the Director of the Royal Institute for Experimental Therapy and of the Georg Speyer House for Experimental Chemotherapy at Frankfurt-am-Main, who was probably the best known as well as the most original and ingenious pathologist of his day. Paul Ehrlich was born in 1854 at Strehlen, in Silesia, his father being a Jew, says the *Lancet*. He was educated at the University of Breslau, and graduated later in medicine at Strasburg. Almost from the beginning of his scientific studies he devoted much attention to the chemical aspects of medicine, especially to the action of chemical substances on living bodies. First he commenced an investigation as to the results produced on living cells by the injection of aniline dyes, and his earliest researches into the methylene-blue reactions of living nerve substances were published as long as thirty years ago.

Paul Ehrlich will be remembered for his investigations on the specific action of dyes on living tissues, for the "side-chain" theory, and for the discovery of salvarsan. Possessed of the truly scientific spirit in the highest degree, his aims were yet consistently practical and utilitarian, and even his speculative and

highly involved hypotheses had a practical aspect, and were often used simply as a scaffolding upon which to build further advances in experimental work. This practical bias of mind puts Ehrlich in company with Pasteur, Lister, and Koch, whose work he continued and amplified, and perhaps the greatest praise that can be given him is to associate him with them as a worthy compeer. It was in the study of haematology that he first came to the front, and here he was a pioneer. The use of methylene-blue injected *intra vitam* as a means of studying oxidation processes in the body, although a commonplace of the text-books of physiology, is perhaps less generally known but is none the less a striking original piece of work.

Until his introduction of salvarsan Ehrlich was perhaps most widely known for his "side-chain" theory. The conditions of immunity have had surprises even for those who have observed them most closely. That in the case of many diseases one attack was capable of rendering a person practically perfectly immune to subsequent infection was indeed strange, and the fact that very occasionally a second attack might be recorded did little to lessen the wonder. Though the fact was so patent, the explanation was far to seek. Equally strange was the fact that some epidemic diseases might affect animals and yet not attack man. Both before and after the discovery that infectious maladies were due to the presence of germs many theories were evolved to attempt to account for the immunity, but none could be accepted as really explanatory. Ehrlich did not venture to attempt to give a real explanation of the facts in connection with immunity, but he showed that very many of the problems of infection and immunity were closely allied with the action of drugs. He pointed out that all antiseptics were not equally active with all micro-organisms; he showed that an antiseptic capable of destroying one germ might prove useless in the very same strength against another bacterium, though another antiseptic, powerful against the second microbe, might prove unavailing in the same strength against the first. Then he showed that the same was true of all drugs acting on living bodies; hence it followed that there must be some condition present in the living cells of the body which enabled a drug or an infecting microbe to affect that living cell. This conception of the phenomena of immunity is formed entirely on a chemical basis, and there is much that may be urged in support of the theory; but it would be going too far to say that it serves to explain all the facts which are known. Nevertheless, the theory is useful as a working hypothesis, and it has served as the basis of an extensive investigation. Once it has been recognized that the phenomena of immunity are best explicable as the results of chemical reactions; we are provided with a starting-point for the investigation of the mode of action of the substance in the body which causes the immunity, and the formation of antibodies for therapeutic use has gone far to support Ehrlich's theory.

Another of Ehrlich's practical contributions to the study of immunity, and an important one, was his brilliant work upon the standardization of diphtheria antitoxin, but the discovery which

brought Ehrlich's name before the public was the introduction of salvarsan. It was no haphazard discovery, but it was based on a long series of investigations proceeding along well-defined lines. He aimed at some substance which should destroy completely all the *spirochætæ pallidæ* in the body. He started from the fact that arsenic had been used with success in the treatment of syphilis, and he designed to obtain a substance which, while causing the minimum of harm to the human body, should be a potent agent in destroying the *spirochæte*. After a large amount of work Ehrlich at length evolved salvarsan, or dioxydiaminoarsenobenzol, "606," as it was called in the convenient phraseology of the laboratory, and the drug was found at once to exert a wonderful influence on syphilis. Experience has confirmed the value of Ehrlich's work. The drug causes a marvellous improvement to occur with extreme rapidity, and though experience has shown that there is no "sterilisatio magna," yet the benefit is great and lasting, and this in the vast majority of cases without any harmful effect on the patient.

Ehrlich's life has been full of great and useful achievements, and his loss at the present time is one upon which all nations, whether at war or at peace, can condole with Germany. Honoured by many countries and universities and a winner of the Nobel Prize, he was a benefactor of mankind, and we gladly pay homage to a life spent in the advancement of knowledge, the saving of life, and the lessening of suffering.

Professor Ehrlich married Hedwig, the daughter of Privy Commercial Councillor Pinkus, and he leaves two daughters, both of whom are married to German scientific men.

ALBERT MARSHALL, M.R.C.V.S., Victoria Road, Dartmouth, S. Devon. Graduated Edin., July, 1886. Mr. Marshall died on August 6. Aged 50.

GEORGE ALEXANDER THOMPSON, M.R.C.V.S., City Chambers, Edinburgh. Graduated Edin., December, 1891. Mr. Thompson's death occurred on July 1.

HAROLD SANDERSON, Ladywell, Roundhay, Leeds. Died on July 27, aged 36. Graduated July 17, 1902, London.

GEORGE WARTNABY, the Board of Agriculture's Veterinary Inspector for the counties of Staffordshire and Derbyshire, died at his home, Burton-on-Trent, on the 30th ult., at the age of 64.

REGISTERED "EXISTING PRACTITIONER."

ROBERT F. SANDERS, Windmilland, Black Torrington, *viâ* Highampton, Devon. Died on August 4, aged 72.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.



THE LATE CAPTAIN M. STEVENSON, M.R.C.V.S., A.V.C.(T.)

THE VETERINARY JOURNAL

OCTOBER, 1915.

Editorial.

ON LITERATURE AND LITERARY ABILITY.

It is not given to every man to be a stylist or to describe plain facts in terse or ornate language, but almost every educated individual can express some of his thoughts in writing, or narrate with his pen the daily incidents affecting his calling or his own walk in life. The literature of a nation is a good guide as to its advancement or decay. What applies to nations relates with equal force to bodies of men banded together by mutual laws, privileges and advantages, all travelling in a like direction over the same fields. Where there are many travellers with open eyes diverse views will be taken and various facts seen; one will observe and note what another misses and overlooks, and so a vast store of experience may be gained which if expressed in writing will be all for the benefit and advancement of the body politic. The Elizabethan period was noted for the great revival in learning, and for the beauty, depth and profuseness of our literature as a nation. Great books and fine minds flourished at that time, and some of us are of opinion that English literature reached its zenith then and that neither before nor since has its standard been carried to such supreme heights.

We are a little body of scientific men deeply interested in the welfare of animals, a valuable force in the economic and utilitarian life of the nation.

We should be a learned and intellectual group of individuals and our literature should be an adequate expression of the life and vigour that is in us. What of it? Can it generally be said to be plentiful, profound, or greatly specialized? Compared with the medical man, even taking into consideration the difference in numbers between the totals of the members of the two professions, do we equal them proportionately in the output of technical

books? Almost all aspects and every field of surgical and medical knowledge have been traversed and explored by those who care for the human body in health and disease. We need to take an example from them in this matter. For years we existed on one standard volume of medicine and surgery of British extraction. It was and is a good book of great value, but indirectly it remained for some time as a monument of veterinary inactivity in literary fields.

Ability to write is plentiful enough within our ranks. A little practice will tend to perfect the gift. These lines are written to try and cause some introspection in our midst. We ought all to endeavour to be useful in our day and generation. Utility is a man's sole excuse for existence. Clinical records are the foundations on which a handsome superstructure of veterinary medical and surgical knowledge can be built. The writers willing, editors are chiefly grateful, publishers kindly disposed, and (notwithstanding all tales to the contrary) usually fair dealing. Almost every member of our profession can contribute his quota to the erection of a superstructure that will do our body credit and bring us into line with such countries as France, America, Germany (before the War), and to a less degree Switzerland. It is a mistake to suppose that the task is hard. It needs ability, courage, patience and perseverance, but "all knowledge is not at the bottom of a well, or the far end of a telescope. As a matter of fact, an intelligent person, looking out of his eyes and hearkening in his ears, with a smile on his face all the time, will get more true education than many another in a life of heroic vigils." Having obtained the knowledge, let us communicate it for the benefit of our profession as a whole and for the good of generations of veterinary surgeons yet unborn.

Some say that veterinary literature is bound to be stagnant at a time of war like this. We are not of those who hold this view. On the contrary, we consider that it ought to flourish greatly. Many of our members have changed their scene of action and are nomads. A nomadic life creates new thoughts and fresh experiences and tends to bring a flood of writing. At least it has been so in the case of poets, novelists and journalists. The great wanderers have ever been the prolific writers—the men whose literary knapsacks have always supplied a full and regular store of intellectual fare. That a life of warfare is not inimical

to literary activity is proved by the fine and lucid dispatches of Sir Ian Hamilton. We hear, too, that a little booklet has been published giving an account of a "by-election" among the interned British civilians at Ruhleben. All the doings there are gaily described. A case of literature triumphant over difficulties. A rolling stone may gather no moss, but who wants to gather moss if he can accumulate a new supply of thoughts and experiences and keep his intellect alive. The active minds are those that make science and art progress; "to be wholly devoted to some intellectual exercise is to have succeeded in life." "There are just two reasons for the choice of any way in life: the first is inbred taste in the chooser; the second some high utility in the industry selected." There has been a revival in our literature lately. Let us hope it will grow and expand.

G. M.

SWINE FEVER AND THE SERUM TREATMENT.

IN view of the need for husbanding the food supply of the country, the Board of Agriculture and Fisheries decided last August that the slaughter of pigs for the purpose merely of reducing the risk of the spread of swine fever should be resorted to as little as possible, and that the slaughter of breeding sows or partially matured animals purely as a matter of precaution should be avoided. The Board has therefore relied on isolation combined with the slaughter of all swine distinctly sick of swine fever at the time of diagnosis.

Meanwhile, investigations into the efficacy of the injection of anti-swine-fever serum which were being carried out before the War began have been continued, and the results obtained, together with the evidence accumulated as to its use in other countries, show that if proper precautions are taken immunity from swine fever can be established by serum treatment.

The Board are now in a position to offer serum treatment of pigs free of cost, in the early stages of an outbreak of swine fever, and they wish to impress on all owners that to obtain the best results from this treatment notification of the suspected existence of swine fever on their premises should be made at the earliest possible date. Any delay in notifying not only renders the owner liable to prosecution for failing to comply with the provisions of Article 1 (1) of the Swine Fever Order of 1908, but also tends to increase his loss owing to more pigs becoming affected before serum treatment is carried out.

Board of Agriculture and Fisheries,
4, Whitehall Place, London, S.W.

September 18, 1915.

General Articles.

"THE CINDERELLA OF THE SERVICE."

THE WORK OF THE ARMY VETERINARY CORPS.

By E. G. FAIRHOLME.

(Abstracted from *The Nineteenth Century and After*).

WE read in the recent reports of the great European War that the cavalry has, for the time being, at all events, had to do the work of infantry, and some of us have run away with the idea that horses are therefore unnecessary to a modern army, especially since mechanical haulage has, to an extent, superseded horse draught. This view is, of course, entirely erroneous, because there are countless tasks for horses which motor traction could never perform. Cavalry and artillery horses, especially when ploughed land, ditches, or hedges have to be negotiated, must always hold their own, in spite of the modern march of "caterpillar-wheels," motor-cars, motor-cycles, and armoured trains.

Horses can, therefore, not be superseded, though they may be taking a secondary place, perhaps, where formerly they were of primary importance. Even then it has been estimated that over one million horses are being daily employed in the vast battle-field which blazed first in Europe, and has now already spread to other Continents. It must be remembered that, though this may be a war of attrition, and, consequently, things move slowly, horses are being used up because, for one horse in the firing line, there are a dozen, or perhaps a hundred, occupied in the humbler, but no less hard, work connected with the ammunition and supply parks. Therefore it is some consolation to know that there is a strong feeling that much must be done for the welfare of the fit horses, and for the care of the sick and wounded animals who have been pressed, without option, and with no chance of deriving benefit, into the service of the various combatants.

We must remember that the horses of the British Army are the flower not only of the Mother Country, but also of her Colonies and Dependencies. They are not only the hunters, hacks, and carriage horses, who in ordinary times lead a life of luxury, or the omnibus, farm, and draught horses of our home commerce; they include also walers from Australia, the smaller animals of India and the Far East, and the hardy creatures of the Veldt,

Canada, and the Far West—all collected to do service, in one long line stretching round the world, till they reach their ultimate and often horrible fate on the battlefield.

My recent visit to these horse hospitals in France must always stand out in my memory as one of the most interesting and inspiring experiences of a not unvaried life. And the general impression, after inspecting eleven such special centres of veterinary activity, is one of immense admiration for the organization of the Corps, and the ability, energy, and humanity of its members. Naturally, each hospital has some special feature—due either to the nature of the ground or to the individuality of the officer in charge.

The first hospital visited gave me a fair idea of what was to be seen at each of the others, but with each subsequent visit I was better able to gauge and appreciate the wonderful human mechanism, which makes the whole work of the A.V.C. move so smoothly and be of such economic value. Ground had, of course, to be selected which would best suit the purposes of the work, and countless and unexpected difficulties had in each case to be overcome. During the whole of the last winter, one continued fight against rain, with its consequent mud and attendant ills for the horses, had been made, and though I was fortunate in coming at a time when much of the ground had dried and settled, I could in a small measure realize the havoc of the wet by an experience of one day's rain on the clay soil of Northern France. Slipping and sliding about on soil which had, with infinite trouble and skill, been drained by members of the Corps, whose special genius for such necessary labour had been discovered by a far-seeing commanding officer, I wondered how order had come out of what must have seemed at first irreducible chaos, made many times more difficult because horses—sick, debilitated, and wounded—had, at the commencement, been arriving daily, before even the stables were ready for their reception. Everyone with a knowledge of horses will understand how the ground must suffer, when these animals have to stand in the open on clay soil which becomes churned into a sea of mud after a short time. In some places the able Director of Veterinary Services—and it must not be forgotten that the well thought-out schemes for hospital distributions were rudely upset by the retreat from Mons and the shifting tide of battle—was fortunate in discovering brickfields

with drying sheds, or disused mills or kilns, which, after a vast amount of cleaning, have served as admirable shelters; but the difficulties, at each and every place, of providing shelters for 1,000 horses have had to be conquered by that innate quality of facing and overcoming impossibilities which has enabled Britons to become successful colonists. Here in the covered stalls—specially made or converted—stand the horses who have suffered in battle, and have passed through the hands of the various mobile sections at the Front to be sent on as needing special treatment.

With an ample supply of water—in many hospitals kept in troughs at the end of each building—roomy stalls, dry standing, and excellent fodder, these victims of war have every chance of recovery. When the weather and their condition permit they are tied by breast-lines in the open, or are turned out in the roomy paddocks, where they have every opportunity for exercise and grazing. Each hospital also has an exercise track made in a circle, surrounded on either side with strong wooden palisades, around which those requiring exercise are driven. In the centre of this is a sand bath for the mules, and here they can roll about to their hearts' content. Mules require a good deal of handling, and great care has to be exercised in bringing them together. They have to be introduced gradually, otherwise the old campaigners, very much after the manner of the older boys at school, are apt to make the lives of the newcomers a burden to them until they show what stuff they are made of. It is gratifying, and often amusing, to watch the heavy draught horses who, under ordinary circumstances, would spend their leisure after a hard day's work in stuffy stables, galloping round the fields or rolling on the ground with glee at their unwonted liberty. Thus turned out to grass—having been carefully sorted out so that the heavy and strong shall not oppress the weaker ones—with their hind shoes removed to prevent injuries in their frolics, they become hardened and fit, so that when, after being exercised on the roads to remind them of their former work, they are returned to the Remount Department, they are really more suited for the work than when they first arrived from England.

This acclimatizing process has been found to be so successful from an economic point of view that, while the present methods of warfare permit, the newly arrived horses are kept at No. 2

Veterinary Hospital or at the neighbouring Remount Dépôt so that they may recover from the sea journey, which, short though it may be, takes away from their condition and strength.

It was difficult, except for the wounded and worn-out condition of some of the poor creatures, to realize that they were in a foreign country, helping and suffering in the greatest War of the world. At one hospital I saw many horses turned out to recuperate in an orchard where the trees were white with blossom; and, hearing the familiar "Come up, old girl!" "Woa, sonny!" it was indeed almost impossible to realize that only thirty miles away scenes of terrible suffering and hideous cruelty were being enacted. It was with deep gratitude and wondering amazement that I watched it all—so unreal and yet so terribly real—and I felt that at least we had recognized our obligations to our dumb allies, and were striving, as far as we could, to make up to them for the injuries we were inflicting upon them. But, lest I should be misunderstood, let me hasten to add that some of these poor creatures were having "the time of their lives." At one hospital I saw a horse which brought to mind the ordinary sight of an overtired coal-cart horse, standing patiently waiting, with legs at a slant, while his load was being shot down into the customer's cellar—the same attitude, but in what different surroundings!—deep, rich grass, soft underfoot and wonderful to eat, with trees to give cool shade, and fresh water to drink when so inclined. I was glad to think that that poor creature was having a real holiday!

At all the hospitals which I have visited it was the same story—now that the fine weather had come and the ground had been well drained, the horses had their chance. And in spite of all the winter had meant to them, and to the men, they had all stood the hardships wonderfully well. The death-rate was exceedingly small and was constantly decreasing, and the condition of the horses from the Front was also greatly improved. Quittor cases, which had formerly been difficult to treat when the animals had stood in puddles or mud-pies, could now be bandaged properly and would soon yield to treatment; skin diseases and parasites were decreasing, and the wounds were healing under the good influence of sun and fresh air. There was a spirit of cheerful competence which made one feel that, so far as the horses went, all was well in hand, and the ample supply of corn and excellent

hay spoke volumes for the transport and forage organization which made it possible to obtain abundant supplies from overseas. Even when face to face with the stupendous difficulties of the early part of the campaign, the work done by the Army Veterinary Corps was amazing.

During the whole course of the War [wrote the correspondent of the *Daily Mail*], especially lately, one arm of the Service, into which I have been able to get some insight, has surpassed itself. It is the Veterinary Corps, which was first formed after the South African War. This Corps has dealt with some 27,000 horses, probably more, up to date, and it has saved the lives of thousands of animals, of which many would have been condemned as incurable even in time of peace. The other day one of the quite young hands picked up somehow a German horse with three bullets in its shoulder, and, rather against his superior's advice, operated successfully, extracted the bullets, and in a surprisingly short time the horse was as fit as it could be. Some of these young men have indeed developed a real talent for quick and efficient surgery, even under fire.

The care of the horses has been remarkable all through the War. The Germans must have lost four horses to our one simply from want of care in unsaddling and removing harness and feeding. But, apart from this, the Veterinary Corps have saved their thousands by medical skill and organization. It is hard work, but they have their rewards in many amusing incidents. One is worth mention. A young soldier brought in one day a German horse, of which he was very proud. "You couldn't breed a better in Ireland," he said, "and every bit of leather is new." The veterinary sergeant, even before he saw the marks, recognized the horse as English. It had been lost and taken by the Germans three days earlier, and had now come back with brand new saddle and bridle and only a scratch to be healed. Incidentally the episode suggests the astonishing perfection of German equipment. It is only in human—and perhaps humane—things that they fail. That horses and men are not machines escapes them.

It is illuminating to watch the arrival of new patients from the Front and contrast them with the condition of those who have already been successfully treated. The drooping head and lack-lustre eyes, the rough and dirty coat, the staring ribs, the upheld foot, the sore and irritating skin, and often, too, the

hideous wound, tell their tale of suffering patiently borne, which appeals at once to the keen soldiers who are there to remedy the various ills, to cleanse and heal the torn flesh. Skin diseases, quitters caused by nail-pricks, suppurating corns, frost-bites, or ulcerated legs from constantly standing in mud or water; swollen hocks, broken knees, saddle or girth galls, &c., are the common ills to be dealt with; but pneumonia and chills are frequent causes of trouble, and many horses arrive so lame and "done-up" that only a rest cure at the Convalescent Horse Dépôt will put them right. Many cases of wounds from shrapnel, jagged bits of shell, or bullets arrive also, and these often necessitate complicated operations. Many a fine horse with a shoulder or quarter torn or punctured by a bullet stands in the line waiting to be attended to. All cases which necessitate operations are treated with a care formerly only given to human beings; while those to which painful dressings have to be applied are spared pain by the application of local anæsthetics. Each animal to be chloroformed is, after becoming unconscious, cast on a specially prepared operating bed, made of sacks stuffed with hay, fastened together and covered with sailcloth. Here the surgeon performs the operation with quickness and dexterity, and is assisted by men who watch the patient and, if necessary, are ready with another dose of chloroform. All seem equally keen on the success of the operation, and proud of the ultimate recovery of the animal. Having seen such operations performed, I can echo the remark made by a friend, who said that, should necessity arise, he would gladly be operated on by a modern veterinary surgeon, for they are as far removed from the old-fashioned horse doctor as the modern surgeon is from the "sawbones" of the past. So, too, is the modern pharmacy with its sterilizing boxes, its disinfectant sprays and countless instruments, all scrupulously clean and orderly, different from the old-fashioned and very dirty collection of instruments of torture which more often brought death than recovery. Here, with everything in its place, and with a constant supply of drugs sent from the base veterinary stores, one understands the change which has come over the whole profession, and has brought it into line with its elder brother, that of the physician and surgeon for human beings.

The arrangements for the treatment of the horses are almost as elaborate as those provided for the wounded troops, and include

a Convalescent Horse Depôt, where the recovering animals, like human patients, lead an open-air life and have special feeding. Situated in the richest grazing country in Northern France, and covering an area of something like twenty miles, the patients, some resting from the too often necessary overwork and strain which produce debility, others recovering from the wasting effects of bad wounds, injuries to their feet, or skin disease, can graze at will amidst ideal surroundings, sheltered from cold winds by high hedges, in paddocks with an ample supply of good, fresh water. Constantly under the keen eye of an A.V.C. officer and a staff, which on War Establishment should be 404, these horses, some 5,000 or more, grow sleek and are cared for as though they were candidates for some local horse-show. Here, too, are shelters built from the R.S.P.C.A. Fund for those that need special care; "skin lines" for those whose troubles in this direction have not been completely cured, and handy little enclosures for other horses who need extra watching or diet. Here, as everywhere else, were sad-looking animals, weary in body and mind, but I think the most pathetic were those poor artificially reared creatures who wandered aimlessly about in the rich land, unable to grasp the fact that the grass was to be eaten, and who had consequently to be acclimatized to their novel surroundings and educated to benefit from the grazing which surrounded them.

Figures, of course, speak more eloquently than words, and surely the good results of the work already done by the A.V.C. will more than justify the remark already quoted—that it has "surpassed itself." And it must not be forgotten here that forty of the veterinary officers are employed on horse transport duty, when they are responsible for the feeding, watering, and treatment of all horses and mules on the ships, and for the destruction of any incurably diseased or injured animals. The losses of horses under their charge, except in one or two serious instances which were unavoidable, have consistently been under 1 per cent. This, when one recalls the fact that the animals are imported almost from the four corners of the earth, is reassuring. But it is the figures showing the whole work of the A.V.C.—so far, of course, as one is allowed at this juncture to publish them—that reveal the value of the work. The total number of animals treated in hospitals up to date has been 81,134: of these 47,192 have been returned to Remounts as cured, 4,266 have died,

4,843 have been destroyed, and 1,842 have been cast and sold, while 22, 991 still remain in the hospitals and at the Convalescent Horse Depôt under treatment. The sick-rate has been approximately reduced by one half, the number of convalescents by one-third, the death-rate by a little less, and the number cast and sold is an infinitesimal proportion of the whole number.

"Sir John has received most satisfactory reports of the work done up to now by the Society, and has no doubt that its efforts for the care of the sick and wounded horses will have a most beneficial effect in shortening the period of sickness, and in reducing the wastage of horseflesh in the Army in France."

It is, of course, one thing to plan and arrange for an army, or even one of its many departments on paper, so as to fit in the various units of an immense force as part of the great "War Game," but it is a totally different affair to transfer the whole scheme to actuality, and to transport the complete machinery to a country across the sea. All the best organization on paper may be upset in an instant, and may have to be adapted to circumstances which, again in their turn, may give place to fresh ones dependent on the unexpected happenings of the moment; so that the elasticity of a scheme cannot be calculated with precision. The preconceived and defined work of the Army Veterinary Corps—which, in its present organization, is largely a result of the experience gained during the South African campaign, and which, as a Corps, dates back only twelve years—is a case in point.

To appreciate fully the change that has come over this special side of war, one must have some idea of the veterinary organization which existed in the past. About twenty years before the outbreak of hostilities in South Africa the "Regimental" system obtained, with a veterinary officer responsible to no one but the commanding officer of each regiment. This meant, of course, that no other regiment could call on his services, and in time of war he would only attend to the animals of that regiment to which he was attached. The result was that each regiment had to look after its own sick horses under a system which, years before, was shown to be impossible for the care of men on service, and applies with equal force to animals. This service, having at last been recognized as a failure, was converted into a department, to which the veterinary officers were attached, but as no subordinate and definite *personnel* or

hospitals were provided, the difficulties under which it laboured during the South African campaign were immense and necessarily led to an inefficiency of method which was unavoidable. But while the British Army authorities still "economized" in this important direction, and withheld their sanction for the formation of veterinary hospitals, the Veterinary Department of the Indian Army had been given a free hand to create its own organization and was able, on the outbreak of the South African War, to send veterinary stores and three fully equipped hospitals, each of which was capable of sub-division into two complete, self-contained establishments. From India also came the first mobile veterinary field chests, containing the necessary instruments, dressings, and medicines, which have served as a model and are being used at the present time.

It will readily be understood that a very special training is, in peace time, required so that the work of healing sick and wounded horses can be carried on by competent men. For this purpose, one of the first things to do was to establish a veterinary school where the men, mostly selected from cavalry regiments, could be instructed under the veterinary officers. In the many classrooms and laboratories of this school, the practical training, as well as the theoretical teaching which is indispensable, is given, and the men renew their school days. In one room they learn the elements of anatomy; in another they take notes on the structure of the horse's foot; while in other parts of the building they are taught dental work, farriery, stabling, food selection, hygiene, and a thousand and one items which make for the comfort and health of the Army's four-footed charges. They learn to clip horses, to poultice them, and to feed them with this or that food, according to the nature of their work or their state of health. Before leaving, too, they are instructed in their management on the march and on board ship; and last, but not least, are taught to destroy them when necessary, with certainty and humanity. Attached to the school is a splendidly equipped Röntgen-ray department, and research laboratories are provided where officers may carry out advanced work in the prevention and cure of disease.

Extremely interesting, too, is the museum, which contains a large collection of bones showing the effect of sabre and gunshot wounds. Here also are to be seen *papier-mâché* models of field hospitals and concentration camps.

From these fully trained non-commissioned officers and men the military veterinary surgeons gain the assistance in carrying out their special work which was formerly supposed to be rendered by untrained, but perhaps very experienced, farriers. The commissioned officers of the Corps, as in the old days of the Army Veterinary Department, are qualified veterinary surgeons who have passed four years at a veterinary college or university. They do not pass into the Army through Woolwich or Sandhurst, but sit for a special examination after their collegiate course. On joining the Corps each undergoes three years' probation, during which the fitness of the young officer for his career is decided. Of course, in time of war this period of probation is waived, and civil veterinary surgeons are given commissions and work under military discipline. It says much for the patriotism of these men that so many have been found ready to throw up their private practices for this national work. For instance, at the present moment, some of the leading professors, now holding the comparatively humble position of lieutenants, are working in veterinary hospitals under men who have in former times attended their classes as students!

The Corps has, of course, been greatly strengthened for the period of the War, and the enlistment and training of the necessary and often raw men—a work shared by the R.S.P.C.A.—has added to the task of organization. From a peace strength of 166 officers and 249 non-commissioned officers and men, it has been increased to 700 officers and 8,000 men. These numbers include, of course, the men of the special units working in the field, besides the mobile veterinary sections and veterinary hospitals, which are naturally increasing with the growing needs of the Army.

On active service each division of troops, in addition to veterinary officers attached to units, has a mobile veterinary section, consisting of one officer and twenty-two men, all mounted and provided with all the necessary veterinary medicines, instruments, dressings, &c., contained in a veterinary chest for the officer, and small chests and wallets for his subordinates. The work of this section is controlled from divisional headquarters by a senior veterinary officer, to whom the officer in charge of the section is accountable. This officer is the responsible adviser of the Commander and his staff on all technical matters appertaining

to the veterinary service of the division, and administers the *personnel* of the Army Veterinary Corps attached to the division. The officers attached to the units are responsible for the treatment of the sick animals, and submit a weekly return of casualties to the senior officer; they also advise the commanding officers on all matters relating to the well-being of the horses under their charge. The detection and control of contagious diseases is one of their most important duties, another being to decide when a horse, owing to his condition, should be painlessly destroyed.

Mobile sections are divided into two sub-sections—one to collect fit horses from the firing lines and other places and to destroy the badly injured ones; the other to receive the sick and wounded animals and convey them to railhead, and thence to the nearest base veterinary hospital. Each of these hospitals—which are organized to deal with 1,000 cases—has a staff of 399 officers and trained men, including farriers, shoeing-smiths, saddlers, dressers, stable hands, and Army Service Corps' drivers for the ambulance, forage, and other Service wagons.

Medicines, dressings, instruments, and bandages are of course necessary; but the veterinary officer on the battlefield does not rely on them to a great extent. His chief anxiety is to get his casualties, whenever possible, and if this can be done without unnecessary suffering, transferred at once to one of the hospitals where, naturally, there is every provision for their treatment. Should circumstances permit, however, cases of slight sickness or injury are treated on the spot, and a temporarily incapacitated horse is turned out to grass for a few days at a neighbouring farm. In the event of a rapid advance, when time does not allow of the immediate transfer of horses to railhead, they are left at some suitable place in charge of a non-commissioned officer, and are collected later by the second subsection of the Mobile Section.

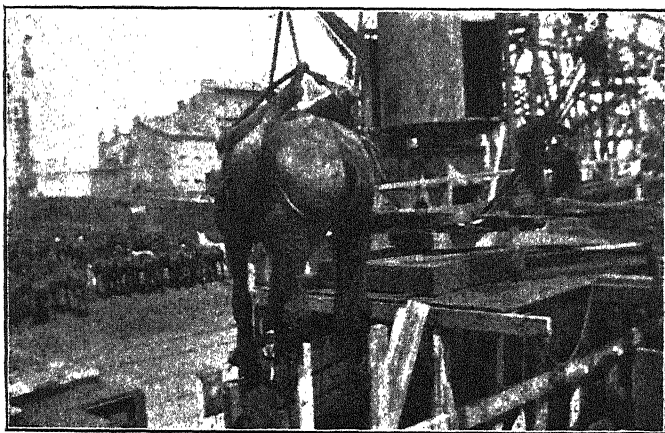
When, without any undue and insular partiality, we contrast our own splendid veterinary service with the corresponding organization of other armies, and learn that at every point the British system has established a marked superiority, we may well congratulate our Army veterinary authorities for their thoroughness and foresight. When we reflect, too, that this admirable system is a product of but twelve years' growth, and that all its diverse arrangements have been made on original lines, we realize with pride that our Army is second to none in initiative, and sets an example to the whole world in humanity to its dumb servants.

WITH THE CROIX VIOLETTE IN FRANCE.

Original Snapshots supplied by Mr. J. T. SHARE-JONES, F.R.C.V.S.



Placing wounded horse in a "Croix Violette" ambulance.



Unshipping horses at the base.



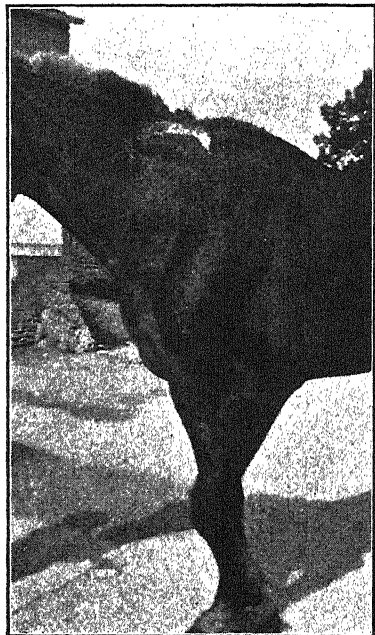
An operation in progress.



Administering restorative to a chloroformed horse.



Operation in progress.



A successful operation.



A big operation on the withers. Removing splintered bones.



A successful operation for poll evil.



A jam lunch.

MILITARY EXPERIENCES OF A GERMAN VETERINARY SURGEON.

R. EBERLEIN, who, in the capacity of veterinary officer of the Eighth Army Reserve Corps, participated in the German campaign against France up to the end of October, has reported (*Monatschrift für prakt Thierheilkunde*) his numerous experiences and observations during that period. He remarks that modern war confronts official veterinarians with a new and serious task, and that many who are still novices may gain much aid in it from the experience of others.

The horses of the corps to which Eberlein was attached (with the exception of some officers' horses) were animals acquired from private sources, and of the most diverse breeds. As a rule their ages ranged from 6 to 12 years; some were a little younger, but none were less than 4 years old. Notwithstanding the tremendous fatigue which they had to undergo for six weeks, which included fast marches of from sixty to seventy kilometres (one kilometre about five furlongs), the animals bore the strain satisfactorily; but in the first fifteen days it was necessary to get rid of some that were too debilitated. A certain number of horses sensibly lost condition, but upon the whole the state of nutrition was satisfactorily maintained, and a rest of eight days sufficed for restoration.

Among infectious and internal diseases, strangles was espe-

cially prominent. It was introduced by some young animals from their source of origin. Although the disease was rather benign in character, it caused much loss of condition in many subjects. It did not cause many deaths. The treatment adopted was incision of suppurating lymphatic glands, administration of Carlsbad salts, and the external application of "revulsive frictions." Recovery took place slowly, and was accompanied by mild forms of such secondary affections as petechial fever and purulent catarrh of the nasal and frontal cavities.

Cases of colic due to irregular or improper feeding were comparatively few. Most of the colic seen was caused by over-feeding on "rest days," and in these cases treatment with arecoline gave good results. Cases of gastric catarrh and of intestinal inflammation were rather numerous; and the last-named were nearly always fatal. There were also cases of meningitis, which, if mild, yielded to a copious bleeding and the administration of arecoline. Catarrh of the upper respiratory passages, bronchitis, and cardiac weakness from over-fatigue, were common. The last-named condition was treated successfully by the subcutaneous injection of caffeine and camphor, and the administration of alcohol by the mouth. The author mentions one occasion upon which twenty horses became affected at the same time with urticaria, perhaps through drinking bad water.

The principal external affections seen, naturally, were wounds of all kinds. Large wounds were sutured. Contused ones were regulated at the edges and treated open. The author gained excellent results from a method of disinfection which he has adopted for years, consisting in drying the wound, removing the hairs, and treating with dilute tincture of iodine or with mastisol. (Mastisol is a solution of various resins, especially of mastiche in benzol, with a small addition of ether and of a colouring substance. It is prepared by the firm of Schubert, of Berlin. Transl.) He always avoided washing the wounds, even if they were soiled with earth. Recovery was very rapid; and the results were especially good when mastisol was used. Purulent, sanguineous and gangrenous wounds were also treated with pyoktanin and with powdered dry dressings. Contusions of the tibia, the radius and the joints were painted with mastisol.

Saddle sores, &c., were very frequent, and rapidly became

aggravated when the horses had to remain saddled. As the corps to which the author belonged advanced rapidly, it was not possible to rest the horses; and so these lesions, although treated from the start, became aggravated and led to serious necrotic processes of the back, the ligamentum nuchæ, the spines of the dorsal vertebræ, and the scapula. With all this, the cases of septicæmia were not common; and slaughter was only necessary in a few instances.

Cases of laminitis from over-fatigue were common and were often accompanied by colic. Treatment consisted in injections of arecoline, preceded by copious blood-letting.

There were also some serious cases of suppurative and gangrenous pododermatitis following lesions of the feet, laminitis, and cartilaginous quittors. Punctured wounds of the foot from nails or other objects penetrating the sole and coronet were common; these, treated with tincture of iodine or with mastisol, recovered in a few days, with the exception of a single horse which developed a fatal attack of tetanus.

There were some cases of abortion in mares due to excessive fatigue. The mares were from two to three months pregnant, and were requisitioned because the owners concealed their condition. Generally they showed symptoms of colic before abortion; and many of them, despite all treatment, died of purulent endo-metritis.

According to the author, the bullets of the French infantry inflicted much larger wounds than those of the Germans. The French bullets are longer and heavier than the German ones, and are tapered for about half their length. Consequently, if they struck against a resistant object they assumed a transverse position; and by thus penetrating the body they caused wounds resembling those made by the dum-dum bullet. The author had to treat many of these wounds in the horses of Hussar patrols, and had excellent results with mastisol and with tincture of iodine. He always avoided useless washing and probing.

The author records some isolated cases of interest. One was of a fissure of the tibia caused by a revolver bullet discharged from a distance of only 3 metres; fifteen days later, the bone became fractured. Another was a peculiar instance of serious "shock" in a horse from the bursting of a shell in its immediate vicinity. The animal fell to the ground as if struck by the

lightning, and, although unwounded, for some time showed muscular tremors, unsteady gait, slowing of the heart's action, small pulse, pale mucous membranes, and loss of appetite. The horse improved gradually and recovered after three weeks.

Numerous wounds from splinters of shell were seen. Shrapnel wounds were not observed, because shrapnel burst too high.

The author characterizes the bombs of the aviators as "very murderous." They weighed at least ten kilogrammes (about 227 lb.), and the smallest fragment of them sufficed to wound seriously. One bomb alone killed three soldiers and seven horses of a column, and fatal wounds were often sustained even at a distance of more than a hundred metres from the place where the bomb burst.

The wounds produced by the darts of the aviators were also very serious. These darts were 12 cm. (about 4 4-5 in.) long, and were thrown in bundles of from 50 to 500, from a height of 1,500 metres and more.

The maintenance of the horses, upon days of fighting and of forced marches, left much to be desired. For days together the horses of the artillery and the train could not be unharnessed, much less groomed. The food supply in the author's period of service, was satisfactory, but the conditions with regard to water were bad. The enemy covered the wells and springs with manure and earth, so that the Germans only had muddy pool water at their disposal, which the horses would not willingly drink. Not rarely journeys of some kilometres had to be made, morning and evening, to water the horses; and the lack of good water caused many animals to sensibly fall off in condition.

According to the author, it is of great importance that the veterinary surgeon should supervise the horse shoeing. The shoes generally lasted four weeks, and even six or eight, especially if the feet were overhauled on "rest days," and loose nails changed and strengthened. Shoes and nails were requisitioned in France, because the reserve materials did not arrive from Germany, and the farriers' field stock was insufficient.

The transport of fresh horses from Germany was slow and troublesome. The horses arrived fatigued by the long journey, and were not strengthened by the life and work of the field. Horses were rarely captured as war booty, for the enemy killed those that could not be saved from falling into the hands of the Germans.

Horses which were injured, exhausted, or incapable of service from other causes, were collected into hospitals. The veterinary surgeons in charge of these destroyed incurable animals, sent those which required a long treatment to the rear, treated all the rest, and then sent them to the front. Numerous horses, which otherwise would have had to be destroyed or abandoned, were saved and restored to usefulness by means of these hospitals.

Finally, the veterinary surgeons were also charged with the inspection of meat for the whole army, and this service proved to be of great utility. The meat inspection was regulated according to the laws in force in Germany, which give special importance to the inspection of the animals during life.—(*La Clinica Veterinaria*.)—Per *Chicago Veterinary College Quarterly*. [Cf. pp. 151 and 152, *VETERINARY JOURNAL*, March, 1915.—ED.]

A NEW APPARATUS FOR THE ADMINISTRATION OF RESPIRATORY ANÆSTHETICS TO ANIMALS.*

THE apparatus described below has thus far been tried only upon horses, but the control the anæsthetist has over the delivery of the drug to the patient leaves no doubt in the writer's mind that it will be as popular for anæsthetizing any of the domestic animals, large or small, old or young, feeble or strong.

The greatest difficulty the animal anæsthetist has is that of delivering a definite amount of anæsthetic to his patient. There is never any assurance of how much or how little of a given amount of drug poured upon a sponge is actually consumed by the patient and how much is lost in the surrounding air. A vaporized anæsthetic like any drug has its lethal dose; if too much is given, the patient dies; if the dose is too small the effect is not satisfactory. The apparatus is designed to partly overcome this, the greatest obstacle against the general resort to respiratory anæsthetics in animal surgery.

It does not require much well-vaporized chloroform or ether to anæsthetize an animal if the vapour is consumed with certainty and with regularity. To effect a regular and certain delivery

* Presented at meeting of Illinois Veterinary Medical Association, Springfield July, 1915.

and consumption with the crude nose-bags and sponge ordinarily used by animal anæsthetists is quite impossible. The struggling brutes, no matter how confined and no matter what sort of apparatus was used, would defeat the most experienced anæsthetist's efforts to regulate the amount of drug being consumed during the first phases of the administration, and after the patient had relaxed there was never any way to determine how much evaporated into the air and how much was taken in and absorbed. On this account the chloroforming of animals subjected to long operations was always a risky undertaking, because relaxation could only be maintained by the administration of a great amount of chloroform. The patient during the long procedure consumed an overdose—the body was over-saturated—and some of the untoward sequelæ of chloroforming were sure to supervene. In the short operations, lasting but a few minutes, these bad results were not in evidence because the dose never reached the danger point, but in operations lasting one hour or more there was always danger that the limit of security would be over-reached unexpectedly. Safe chloroforming requires safe dosing. When a practitioner administers this poisonous, elusive vapour to a patient without any real control of the amount that is being consumed, there must always remain a dread of possible overdosing, and it requires a wealth of experience not possessed by many veterinarians to know just when the danger point is being approached.

The administration of anæsthetics through the crude face masks used by veterinary surgeons has always been uncertain in its effects because the reaction of the patients—the only real guide to the amount consumed—is not adequate protection against overdosing except in the hands of those who have had more experience than the average veterinarian can ever hope to acquire, and even the most experienced will err in their judgment. On this account it is plain that we need a means of giving to a patient that exact amount it will require to bring about the desired state of unconsciousness and muscular relaxation and no more. The apparatus is designed to accomplish this feat.

In talking over the possibility of making an apparatus of this kind with Mr. Christianson, of Sharp and Smith, Chicago, our consultations culminated in the manufacture of a cheap and now

entirely workable instrument, and each successive experiment proves that we have actually invented something that is worth while. The apparatuses used by human anæsthetists we found were too complicated and therefore entirely too costly for general adoption by the veterinary profession. In scrutinizing these complicated affairs, we were unable to appropriate any part or principle and therefore we decided to adopt a new idea—the delivery of vapour by the use of heat

The apparatus as now manufactured consists of a container divided into two compartments, one for chloroform and one for a mixture of chloroform, ether and alcohol, each holding about 25 oz. This container is surrounded with a water jacket under which is an electric heater (an alcohol lamp will answer where there is no electric current). The top has two pressure gauges to announce the amount of pressure in each compartment. The outlets for each compartment converge into a single tube, and each outlet is equipped with a valve so that vapour from either compartment or both compartments at the same time may be given as one desires.

When the pressure in the compartments has reached about sixty pounds per square inch, indicated by the gauges, a rubber tube of smaller calibre is passed into the trachea through the uppermost nostril. The other end is attached to the outlet and the valve of the compartment containing pure chloroform is opened. Immediately the pressure sends volumes of vaporized chloroform right into the trachea. Both nostrils are left free to exhale and inhale without interruption, and as there is no sense of suffocation felt as when the nose is smothered up with a face mask, the patient passes through the stimulating stage of anæsthesia without much struggling. If there is a little delay in producing a narcosis the undermost nostril may be temporarily closed with the fingers, but this is seldom necessary. The patient usually passes quickly and safely into a satisfactory anæsthesia. As soon as there is the desired relaxation of the musculature (profound anæsthesia) the valve is closed. The anæsthesia is thereafter maintained by occasionally opening the valve to send in a gust of vapour as the patient seems to require. It is our practice now in order to assure still more safety to bring the patient into the desired state of relaxation with the vapour from the chloroform compartment, and then maintain the anæsthesia

during the operation from the compartment containing the mixture of alcohol, ether and chloroform. In this way animals are kept in a state of unconsciousness for indefinite periods without consuming a dangerous amount of drug. The method has shown us that it really requires but little chloroform or ether to anæsthetize an animal if the vapour is rapidly absorbed and appropriated by the organism.

When an animal is about to be subjected to a serious operation of considerable duration (like the ablation of a large scirrhus cord, for example), we first administer a preliminary anæsthetic of chloral per os. This is given in solution as a drench to assure a more rapid and a more concentrated action than if given in a bolus or capsule. About 40 grm. is the dose usually given. An hour later the patient is secured in the recumbent position, the tube passed into the trachea and the vapour turned on. As soon as the respiration has become soft and relaxation of the musculature is beginning the current is lessened by partly closing the valve. When the relaxation has reached the desired point the valve is closed. The operation now begins and continues until there is the first evidence of revival; then the assistant is simply directed to open the valve of the A. C. E. compartment for a mere moment. Almost instantly the patient relaxes again from the gust of the A. C. E. vapour that was sent into the trachea. This opening of the valve is continued as often as necessary to maintain with this terminal anæsthetic (the A. C. E. mixture) the desired state of anæsthesia throughout the whole operation. There is little danger of overdosing, as the actual volume of drug consumed is smaller than with the face mask and sponge.

This apparatus has never been publicly demonstrated; the experiments thus far made have been before private audiences. It is, however, planned to give public demonstrations to the members of the profession whenever the opportunity permits.—*American Journal of Veterinary Medicine.*

Parliamentary.

SWINE FEVER.

MR. ACLAND stated, on September 16, in replying to Sir John Spear and Sir Walter Essex, that the recommendations contained in the final report of the Departmental Committee on Swine Fever had in the main been adopted and brought into operation in respect to the revocation of certain restrictions on the movement locally of swine. The procedure to be adopted as to serum treatment in swine fever outbreaks would be published almost immediately, and would be operative from September 26. Any further action must be based upon experience acquired.

CARBOLIC ACID DISSOLVED IN PARAFFIN OIL AS
A MEANS OF PREVENTING SEPSIS IN GUNSHOT
WOUNDS.

BY LIEUTENANT M. K. ACHESON.
Royal Army Medical Corps.

As the result of the publication of Sir W. Watson Cheyne's illuminating oration in the *Lancet* of February 27, on the treatment of wounds in war, some experiments were undertaken at No. 1 General Hospital, on similar lines to those described by him.

Owing to stress of ordinary routine laboratory work, the limits of time, and to active service conditions, the work had to be considerably curtailed.

After going over some of the ground already covered by Sir W. Watson Cheyne, ordinary crude paraffin oil was adopted as being a promising medium for bringing antiseptics in contact with pathogenic micro-organisms. Carbolic acid was dissolved in water-free paraffin in varying percentages. The solution was then tested in reference to its bactericidal effects, its diffusibility, its power of penetration through organic substances, its toxicity, its volatility and its action on the vitality of living tissues and its absorption by them.

Local Bactericidal Action.—This was found to be somewhat similar to that of corresponding strengths of carbolic lotion.

Diffusibility.—A number of similar agar slopes in test tubes of the same diameter were thoroughly inoculated with *Bacillus subtilis*. One cubic centimetre of different strengths of the carbolic and paraffin solution and of various other antiseptics were carefully deposited through fine pipettes at the bottom of the already inoculated agar tubes without touching the agar except at the bottom of the tube. The tubes were incubated in the upright position for twenty-four hours at 37° C. After incubation the distance between the lowest margin of the growth of the bacillus on the agar slopes and the mean level of the antiseptic fluid was measured in millimetres. The results on the average of a number of observations are shown in the table on p. 484.

B. subtilis was employed because of its sporing nature, its rapid growth, readily recognized appearance, and the difficulty generally found in arresting its advance.

Penetration through Organic Substances.—A number of round lids (ordinary tobacco tins, &c.) were obtained. In the centre of each lid a hole was punched about the size of a shilling, over which was placed a circular layer of meat. This meat was about a quarter of an inch thick, free from intermuscular septa, of homogeneous fibre and completely filling the lid. The upper surface of the meat was inoculated with an emulsion of *B. coli communis* and *B. pyocyaneus*. The lid containing inoculated meat was then placed in another lid in such a way that the floor of the upper lid did not come into contact with the floor of the lower lid. Into the lower lid was poured a few cubic centimetres of the solution to be tested. In order to bring the lower uninoculated surface of the meat in contact with the fluid of the lower tin, a pledget of cotton-wool was placed in the antiseptic

	Strength	Distance between growth and antiseptic
Hydrarg. perchlor. ...	1-2,000 ...	No growth.
Tincture iodine ...	<i>B.P.</i> ...	"
Hydrogen peroxide ...	20 vols. ...	30 mm.
Carbolic and paraffin ...	2½ per cent. ...	20·6 "
Cresol ...	5 " ...	19·6 "
Carbolic and paraffin ...	2 " ...	17 "
Carbolic lotion ...	5 " ...	16·3 "
Carbolic and paraffin ...	1 " ...	12 "
Cresol ...	2 " ...	12 "
Carbolic olive oil ...	2½ " ...	8·3 "
Carbolic lotion ...	2½ " ...	7·5 "
Boracic lotion saturated ...	— " ...	1 "
Paraffin oil ...	— " ...	Slight inhibition.

in a position corresponding to the hole of the upper lid. The two lids were then placed in a Petri dish and incubated for forty-eight hours at 37° C.

As this experiment is a very severe test, certain precautions are necessary. All the specimens of meat should be taken from the same animal and from the same part of the animal if possible. As the meat during inoculation will swell considerably, large Petri dishes should be used to prevent pressure of the glass on the meat surface. The layers of meat should not be more than a quarter of an inch thick.

Various antiseptics were tested and compared with different strengths of the paraffin carbolic solution. It was again found that paraffin itself had no inhibitory action, but that even so weak a solution as the 1 per cent. carbolic paraffin acted as a deodorant and prevented marked decomposition in the meat. It not only

penetrated the meat in the centre in the neighbourhood of the point of contact of the solution with the lower surface of the meat, but also crept up around the margins of the meat at the periphery. Broadly speaking, the longer the meat was incubated in the presence of the carbolic paraffin, the more marked was the antiseptic effect.

In the case of hydrarg. perchlor. 1 in 1,000, hydrogen peroxide, carbolic paste in lower strengths than 10 per cent. carbolic oil $2\frac{1}{2}$ per cent., the meat invariably became so offensive that as far as these substances were concerned the experiment had to be abandoned after thirty-six hours.

As regards tincture of iodine the results were rather interesting. Provided 15 to 20 c.c. of the tincture were poured into the lower tray, no decomposition occurred in the meat. With lesser quantities the results were not so satisfactory.

Unfortunately it is inadvisable, from the point of view of toxicity, to inject sufficient quantities of iodine into a gunshot wound to prevent sepsis occurring. Iodine must therefore be regarded as a failure in reference to gunshot wounds, simply because it may not be used in sufficient quantities. There is, however, no reason to discard its use in aseptic surgery.

Carbolic lotion and cresol lotion beginning at strengths of 5 per cent. were also proved to be of value as penetrating antiseptics and deodorants, though the effects of the carbolic and paraffin were always found to be roughly at least two and a half times as great. That is the action of 5 per cent. solution of cresol or carbolic lotion was about equivalent to that of the 2 per cent. carbolic and paraffin. In the case of carbolic and paraffin solution, as long as the pledget of wool remained moist in the tray beneath the meat, practically no decomposition took place in thin sections of the meat, except when very weak solutions were used. The result of this experiment was striking as the inoculated meat reproduces pretty well the conditions found in a septic wound. Clots or dead tissue might be expected to be penetrated for a considerable distance by the carbolic and paraffin solution if kept continuously present in the wound by means of gauze packing and gauze wicks.

Toxicity.—One cubic centimetre of 2 per cent. carbolic and paraffin solution was injected subcutaneously into a guinea-pig (350 grm.) without ill-effect. No toxic effect was observed as a

result of the use of the solution in a number of septic gunshot wounds.

Volatility.—Carbolic lotion incubated 37° C. was found to evaporate about four times as quickly as carbolic and paraffin solution of the same strength.

Injury to the Tissues.—No injury or corrosive effect was observed as a result of the presence of the paraffin solution on raw surfaces. The skin, however, was occasionally blistered.

Absorption by the Tissues.—The characteristic odour of the solution has been noticed emanating from wounds into which it had been injected twenty-four hours previously. Absorption is probably very slow.

Disadvantages.—The inflammable nature of the paraffin should not be dangerous with ordinary precautions. Blistering of the skin is due to the creeping nature of the paraffin, its lack of volatility and the intimate prolonged and continuous contact of the carbolic in the paraffin with the skin.

Conclusions.—The pure carbolic acid which has recently been recommended causes destruction of tissue at the seat of application, and the resulting slough may easily form a nidus for bacterial growth in a wound already devitalized and lacerated.

Carbolic paste in high strengths may prove toxic. It cannot be injected in any satisfactory fashion into a wound and has little or no superiority over much weaker strengths of the carbolic and paraffin solution.

The carbolic and paraffin solution is, roughly speaking, two and a half times as penetrating, twice as diffusible, equally bactericidal and equally non-toxic, as a corresponding aqueous solution of the drug. In addition it remains moist four times as long as an equal strength of carbolic lotion at blood heat.

It is suggested that all penetrating wounds should, as soon as possible, be injected by means of a glass syringe with a 2½ per cent. solution of the paraffin and carbolic, care being taken to protect the skin in the manner described below, and the wound should be then lightly packed with gauze. The plug may be moistened, if necessary, during the train or boat journey to the base hospital.

For prophylaxis the 2½ per cent. solution is recommended, for treatment 1 per cent.

Precautions.—The solutions should be made in bottles which

have been carefully dried and the paraffin should be filtered and water-free. A simple way of demonstrating the water impurity in paraffin is to add a crystal of methylene blue, when the water lying at the bottom of the vessel reveals its presence by the absorption of all the stain. It is necessary, however, to test for water before the carbolic is added, as carbolic paraffin is a solvent of methylene blue. This is important as a small quantity of water in the paraffin assimilates to itself the bulk of the carbolic, and thus a very small amount of water may constitute a very concentrated solution of carbolic acid sufficient to produce local necrosis, and at the same time nullify the essential penetrating effect of the paraffin.

In the experimental treatment of wounds in hospital with a 2 per cent. solution, it was found that blistering of that portion of the epidermis occurred where the superfluous oil overdrained, but it was discovered that if the superficial area exposed to the paraffin were painted with collodion, allowed to dry, and the injection then made, the ill-effects were avoided. The results of the treatment in wounds already septic were frequently gratifying.

Speaking from the point of view of a member of the staff of a base hospital, one is struck by the large percentage of wounded who on admission show comparatively little clinical evidence of being seriously ill, but who within the course of a few days develop the most profound degree of toxicity.

The problem arising in this campaign has been to find a suitable medium for introducing the antiseptic and retaining it in continuous contact with the tissues until such time as further surgical attention can be given to the wound.

As a result of bacteriological investigation and clinical experiment in the wards of this hospital, it would seem feasible that paraffin oil should be thus employed until a better medium is found.—*Journal of the R.A.M.C.*



Radiograph of fracture of the atlas in a Toy Pom, by Guy Sutton.

See page 389, August issue.

Equine Clinicals.

TUBERCULOSIS COMPLICATED BY ECHINOCOCCUS CYSTS IN A HORSE.

By W. W. GOLDSMITH, M.R.C.V.S.

Hitchin.

ON June 10 I was asked to see a lame colt. I found the subject to be a four-year-old Clydesdale gelding, a big, light-bodied, unfurnished colt. A slight swelling round the coronet was all that could be seen. A blister was applied and in about ten days he was sound. I remarked to the owner that he was not in such good condition as his other young horses and that a run at grass would probably do him good. The owner told me he had worked him very hard potato planting; that he was rather poor when he bought him; that he was a good worker. He would turn him to grass, with a feed of corn daily for a month or two.

On July 20 I was sent for to attend the horse immediately as he had caught a chill and was breathing badly. I found him thinner than when I last saw him. Hurried abdominal breathing, looking haggard and anxious, with a soft short cough. Grunted when turned round. Eating very little. Temperature 103° F. A little frothy discharge from nose, mucous membrane slightly injected and a dirty yellow.

On auscultating the chest, a general dulness over the whole of the lungs was found, with absence of sound over large areas. No pleuritic sounds. Heart weak. Pulse 75 to 80 and intermittent. I told the owner he had some grave lung trouble, and judging from his appearance I told him it might be tubercular.

The horse got the usual treatment. He rapidly got worse and died in a week. Not being satisfied as to what was the matter with him, I made a *post-mortem*. I found the lungs one mass of tubercle. There were no tubercle nodules on the pleura. The kidneys were studded outside with nodules. (I made a microscopic slide from a scraping of one of these nodules and they were teeming with tubercle bacilli.) On examining the liver, to my intense surprise I found a number of echinococcus cysts. There were also cysts on the mesentery. During the past twenty-five years I have only found echinococcus cysts in one horse in this district, that was a four-year-old colt. I asked the owner for the history of this horse. He bought him six months previously, in Scotland, from a dealer, and at my request found out that the dealer had him from a small farmer on the Isle of Islay, off the West Coast of Scotland, where he was bred. This combination of diseases is to me unique and I think must be rare.

BOTS—PERFORATION OF DUODENUM—DEATH.

By A. A. LOCKHART, V.S., M.D.V.

Carnduff, Sask., Canada.

GREY mare about eight years old, weighing about 1,200 lb., took sick shortly after starting work in the morning. Had eaten usual morning feed.

When seen by writer about 4 p.m. mare was walking aimlessly about, head lowered and ingesta trickling from the nostrils. Breathing was accelerated and abdominal in character. Pulse small and rapid. No evidence of severe pain and no attempt to lie down.

Attempts at syphoning stomach proved abortive. Died at 11.30 p.m.

Post-mortem.—Almost entire contents of stomach in abdominal cavity and folds of omentum. An area of about 6 in. by 3 in. of the cuticular portion of the stomach was studded with bots as close together as they could get. On examining the first curve of the duodenum, the heads of two bots were noticed protruding through a perforation in the bowel wall, which looked just as if it had been cut out with a punch; and on making an incision through the bowel wall, the lumen was found filled with loose bots. A large teacup would have been required to hold them all.—*American Veterinary Review.*

Canine Clinicals.

INTESTINAL OBSTRUCTION IN DOG.

By CRITTENDEN ROSS, D.V.M.

New York, N. Y.

A YORKSHIRE terrier was presented at the office for treatment, with the history of not having eaten anything for several days. The client thought the dog's bowels were in good condition, but stated that he had vomited for the past two days. Upon examination it was found that the dog had no elevation of temperature, but the eyes looked dull, and the dog was drowsy.

Obstruction being suspected, a mild laxative and stimulating tonic was prescribed with good results. After the second day the patient was lively and began taking nourishment. This,

however, only lasted two days, when the little patient died. An autopsy revealed, just anterior to the cæcum, a small piece of roofing tar, the diameters of which were $\frac{3}{4}$ in. by $\frac{5}{8}$ in. by $\frac{3}{8}$ in., and the bowel wall for some distance anteriorly appeared markedly inflamed, and a portion even necrotic. From the above history and report, also the fact that the beginning of the duodenum was more inflamed than the rest of the organ, I assume that this object was lodged in the S-shaped curve, causing the first trouble; and that its passage onward to the above-mentioned point, accounts for the temporary favourable symptoms.—*American Veterinary Review.*

FÆCAL STASIS IN THE DOG.

By F. C. MAHON, M.R.C.V.S.

Southampton.

Subject.—A ten-year-old black Labrador retriever, the subject in a marked degree of the above-named condition.

History.—Briefly that for days prior to my attention being requisitioned he had passed no fæces and was perpetually straining. Further, that the dog had had a large bone to gnaw at, and it was presumed that such may be causing the general conditions of straining, capricious appetite, &c.

The owner, acting on advice given by a friend, had prescribed the usual panacea for so-called constipation, viz., castor oil, but the patient rejected the same very soon after its administration. My treatment was rectal examination, and I found the organ simply choked with sharp pieces of bone. Gave injections of extract belladonna, liquid petrolatum, and glycerine, which combination caused some liquid motion to pass. Manipulative treatment succeeded in removing several ounces in weight of pieces of bone, very well splintered. The dog evidently was relieved by this, and the owner told me afterwards "quite another animal." Prescribed brandy and liquid petrolatum in small repeated doses for a few days, but obtained no natural movement of the intestines. May add there was no flatus passed to any appreciable extent. My patient remained lively. Pulse strong, temperature but slightly elevated. Ordered beef-tea, bread and gravy, gentle exercise, and daily enemata of glycerine followed.

On the ninth day I gave tinct. nux vomica 10 minims, with $\frac{1}{2}$ -oz. doses of liquid petrolatum. On the twelfth day the dog had a natural motion, and is now as well as ever. Now, in thirty years' experience of canine work, I have never known a dog go so long without some grave constitutional disturbance, following upon pronounced fæcal stasis, and in future will certainly persevere with the use of liquid petrolatum in kindred complaints. the advantages of its employment being that it is practically tasteless, inodorous, and mixes with the food, being taken easily by an animal; further, administered by such means it does away with the continual dosing of animals with noxious and other drugs, which unfortunately is very prevalent amongst so many, both in and out of the veterinary profession. So I may say I am, after years of experience, one of the school who learn to labour and to wait.

My antipathy to castor oil is very marked. I do not ever remember prescribing it for any patient, but have attributed loss, and if not death, aggravation of existing conditions, owing to its use. *Re* the human subject, I know many doctors use it still, but I venture to say that in dealing with an animal who cannot tell you what he has eaten or drunk is another matter. Some of my medical friends tell me they have discarded castor oil in these cases and use liquid petrolatum with marked success. In concluding my remarks, may I record that some years ago I had a case in a butcher's horse who passed no fæces for sixteen days and lived for years afterwards. This patient suffered paroxysms of pain to an alarming extent. I remember that no purgative was administered, and very little of enemata, and if so, belladonna was a sheet anchor; chlorodyne, to a very great extent, was used, and linseed tea given. Rectal injections of beef-tea, milk and eggs, as no food was partaken for nine days. This patient recovered as I say. Physostigmine, arecoline hydrobromide, and the other numerous purgatives were then unknown.

I think I will, *Deo volente*, stick to my old remedies, and occasionally try some new ones, for the rest of my sphere of utility in the profession I belong to, and not be one of the school who do fear to step in where angels fear to tread.

[Liquid paraffin has no irritant effect on the intestinal mucosa. It permeates the intestinal contents and makes them soft. It is especially indicated in cases of constipation and toxic and inflammatory conditions of the intestine.—Ed.].

Abstracts.

ON ROARING IN HORSES.

THERE has been so much written on this subject that it would seem as though no more could be said about it. And yet it is quite certain that the subject is not yet entirely exhausted, if we can judge by the publication recently made of the little book of Professor Doctor H. A. Vermeulen, of the Veterinary School of Utrecht.

In this little book of about 100 pages, with a number of illustrations made from microscopic preparations, the doctor presents a new theory of the pathogeny which has for its starting point the researches made by Walter, to demonstrate the influence of thyroidectomy upon peripheric nerves. Indeed, the theory is that the left laryngeal paralysis that follows that of the recurrent nerve is but a nervous affection, under the influence of troubles of the thyroid gland.

Important experiments have been made, the anatomical disposition has been minutiously observed and described by the author, and if one bears in mind the frequency of the streptococcic infection, which is sometimes so severe, for the thyroid apparatus, and which is so frequently followed by roaring—all those seem to justify the admission of the ideas advanced by Professor Vermeulen.

In his book the author has presented his subject well, he has recorded and given numerous experimental evidences and everything testifies of the great credit that is due to the author for the interesting conception he has presented in his new theory. A conception which in fact has seemed to be confirmed by the good results that have been obtained in few cases where at the onset of the disease, thyroidean opotherapy was resorted to. These good results were but few it is true, but it is nevertheless of great interest to veterinarians if after all the great application of Professor William's operation should find itself likely to make room for an opotherapeutic treatment as beneficial and which would be a grand progress for the therapeutics of roaring.—*American Veterinary Review.*

POULTRY FEEDING.

MR. B. F. KAUPP, M.Sc., D.V.S., has been making experiments at the North Carolina Agricultural Experiment Station into the cotton-seed meal feeding of poultry, and the conclusions he comes to are:—

(1) Cotton-seed meal in dry mash constituting 10 per cent. of the mixture for laying and breeding stock for a space of ninety days in nineteen flocks of birds, has shown no noticeable physical effect. They apparently eat it with relish. This mash is given along with a morning and evening scratch feed and acts only as an adjunct.

(2) Cotton-seed meal constituting 20 per cent. of a fattening ration in seven tests proved unpalatable and the birds having a tendency to become sick of it, did not eat sufficient to make satisfactory gains and in some cases actually lost weight when kept on it for a period of eighteen days.

(3) In cram feeding of twelve birds, four, or 33 $\frac{1}{3}$ per cent. were thrown completely off digestion, as evidenced by the food remaining in the crop. Three died and one later digested her food again.

(4) Twenty per cent. cotton-seed meal in one cram test did not produce satisfactory gains due to its ill-effect, in this quantity, upon digestion.

(5) In two tests upon three Leghorns, gossypol apparently produced the same results as were noted in the cram feeding and other lots.

(6) In the trough feeding which proved unsatisfactory gains, the maximum amount of cotton-seed meal consumed was slightly less than one ounce a day.

(7) In the cramming work the maximum amount of cotton-seed meal was slightly in excess of two ounces a day.

(8) It was noted that birds of weak constitution and delicate appetite are the first to become affected.

(9) All through this set of preliminary tests it was noted that as soon as the quantity of cotton-seed meal consumed reached about one ounce or more per day they may become sick.

(10) A bird sick of cotton-seed meal will usually eat grain such as corn, wheat, or oats, unless the effect be so aggravated that the food remains in the crop.

ON THE TREATMENT OF TORSIO UTERI.

BY VETERINARY-SURGEON U. JORDI.

Huttivill, Switzerland.

THE publications on torsio uteri and its treatment are so numerous that it appears almost impossible to set forth anything new on the subject. Nevertheless, I consider it my duty to make some remarks on a variation in the treatment which to my knowledge has not hitherto been presented. It may happen that with an open os uteri manual retorsion or the remedying of the position by rolling over is beset with difficulties. This often happens in cases where lay helpers have overlooked the presence of a fourth or half-twist torsion, and have uselessly brought the feet and head into the vaginal passage. If I cannot make retorsion in these cases in the usual way I endeavour to remedy the defect as follows: The subject is raised as high as possible behind, the feet of the foetus carefully pushed back into the uterus and a cord put over the nape of the neck. Then the nose of the foetus is taken in the hand and with two helpers on the cord it is slowly drawn upwards. The head of the calf is then generally rather easily brought into the passage and at the same time retorsion is perfect. If in the pulling the pressure on the hand is too strong so that a rent of the orifice is risked, I stop the pulling, thrust the head back again, and keep on repeatedly pulling until the difficulty is overcome. As soon as the torsion is remedied the head is shoved back again, the feet brought up, the patient placed in the usual position, and delivery accomplished. I have succeeded thus in dozens of cases without ever injuring the uterus, and in this way remedied the torsion and accomplished the birth successfully.

G. M.

REPORT ON THE WORKING OF THE VETERINARY
DEPARTMENT OF THE RANGOON MUNICIPALITY
FOR THE YEAR 1914-15.

CONTAGIOUS DISEASES (ANIMALS).

Glanders.—The year has been marked by a still further reduction in the number of cases of this disease, and attention has again been directed more to the regular inspection and cleaning of stables than to wholesale inoculation—which has only been resorted to on the discovery of a clinical or suspicious case in a stable.

The police employed under this heading have been kept steadily on patrol work watching for stray ponies, of which 124 were arrested, against 190 and 457 in the two previous years.

I have maintained, and am still of opinion, that the more stringent measures we adopt against allowing animals to be turned loose on the road-sides the fewer cases of contagious disease of all kinds we shall have to contend with, as both pony and cattle owners are in the habit of turning an animal loose the moment it is sick. Of the 124 ponies found straying, eight were discovered to be clinically affected, and two reacted to the mallein test.

During the year 537 ponies and horses, which were suspected to have been exposed to infection, were examined, of which 480 were inoculated with mallein. Of these 430 gave a negative and twenty-three a positive reaction. This gives a percentage of 4.79, which is a slight increase on the previous year.

The number of clinical cases discovered during the year throughout Rangoon, including those of the stray animals, was 24, as compared with 39 and 61 in the two previous years.

The existing rules regarding the diagnosis of glanders by means of mallein, as laid down by the Local Government, provide only for subcutaneous inoculation. It has now been found that with a modified form of mallein the ophthalmic test is equally certain and very much more easily applied. In America, and most continental countries, it is now being adopted and the reactions it affords regarded as reliable and definite.

I consider the Local Government should be addressed with a view of altering the rules by allowing the ophthalmic as well as the subcutaneous test.

Epizootic Lymphangitis.—This disease simulates glanders very closely and it is difficult to make the gharry-wallahs appreciate the difference, especially in view of the fact that no compensation is payable on its account.

During the year seven cases have been discovered as compared with two last year, each being carefully proved by bacteriological tests.

All the cases occurred in old worn-out animals, so that the loss to the owners was inconsiderable.

Surra.—Two cases of this disease as against four in 1913-14 have been met with during the period under review—both being discovered *in extremis* so that the new method of treatment described in my last annual report was inapplicable.

Anthrax.—Ten cases of anthrax have been reported or discovered, of which two occurred amongst the municipal stud of bullocks and one in a sheep at the slaughter-house. So far as has been possible, anthrax carcasses have always been destroyed by fire, but with the present incinerator this has been made a much easier and simpler affair, and the number of cases should show a tendency to diminish. Last year the number of cases was twenty-three. No case in the human subject has been reported to the Health Officer.

Cattle Plague.—From *post-mortem* at the knackery 106 deaths were ascribed to this cause, as against 60 in the previous year. Two deaths occurred amongst the municipal bullocks.

This disease is brought into the town mostly by the large number of cattle coming to the cattle market, and until some system of quarantine stations on the main roads (Prome and Kokine) leading into Rangoon is adopted, where all animals coming into the municipal area would be examined, very little can be done as a preventive measure.

Epizootic Aphtha (Foot-and-mouth Disease).—From the records obtained from the S.P.C.A. Hospital, this disease was less prevalent than in many previous years. It is spread by the virus from the vesicles occurring on the mouth or feet and is therefore essentially a disease which will increase or diminish according as we permit or disallow cattle to stray. It is not a fatal disease, but an epidemic causes considerable dislocation of cart traffic and consequently to the business of the town.

Rabies.—According to newspaper reports, a large number of

people have been admitted to the General Hospital for treatment on account of having been bitten by dogs. So far as I am aware no death has occurred amongst these which has been attributed to rabies.

There have been ten cases, however, in which sufficient time for observation and diagnosis leave no doubt as to the existence of the disease.

Two poisoners have been employed throughout the year who have used over 6,000 baits. The actual number of dead dogs collected on which the poisoners received the bonus was 5,286, as compared with 3,906, the average of the two previous years.

The question of the propriety of poisoning by strychnine as opposed to the more humane method of the lethal chamber has been referred to the Committee by the Local Government.

No one desires to inflict unnecessary pain on these unfortunate creatures—and if it were possible to catch them no doubt a properly constructed and carefully managed lethal chamber would be the most humane method of destroying them. As a matter of practice, however, it has been found that many of the so-called lethal chambers are nothing more than suffocation chambers, only as the animal is out of sight the pain it suffers, which is quite equal to that of poisoning by strychnine, is not evident.

In some parts of India it may be, and apparently is, an easy matter to catch the dogs with nets or nooses, but the deeply rooted objection of the Burmans to the taking of animal life precludes the possibility of this in Rangoon, and so strongly do they resent the work of poisoning that they use every means to prevent it, even to violent assaults on the poisoners. To overcome this a special dog trap has been devised which so far seems to promise considerable success and which, if maintained, will undoubtedly make the provision of a lethal chamber a necessity.

Figs.—The new slaughter-house at Kemmendine has been built and is undoubtedly quite up to date and the finest anywhere in the East. Owing to pressure of work the engineer has not been able to complete the water or steam supply nor the electric light, so that at present it is not possible to use the place. The following is a brief description:—

The building is 100 ft. by 57 ft. 6 in. internal dimensions, and

20 ft. high to the eaves, divided down the centre by a low partition wall 6 ft. 6 in. high. Half the building is the "killing room," and other half the cooling room. There are two large entrance doors to the killing room and three exit doors from the cooling room, the latter doors having steel-framed porticos 15 ft. by 11 ft. 3 in. as shelters during loading of carts.

Construction.—Foundations are of cement concrete and brick-work in cement. Walls are of brickwork painted outside and cement-plastered inside. Roof is of steel framing covered with Marseilles tiles on teak rafters. Internally the walls throughout have a glazed tile dado 6 ft. high of pleasing design. The floor is paved with grooved blue Staffordshire paving bricks on a concrete foundation, and laid to slope towards glazed earthenware side channels. The latter lead through glazed earthenware trapped gullies to drains. The building is well lighted, and ample ventilation is secured by openings at floor and eaves level, and venetians along the ridge of roof.

Fittings.—The working benches have polished marble tops and are faced with glazed tiles on all sides. The scalding tanks in killing room are specially made with rocking grids and steam heating. In the cooling room carcase rails are provided in the centre of the floor space, and offal rails on the wall side. The tanks, carcase and offal rails are made by Messrs. Lockerkie and Wilkinson, who supplied similar fittings to the Penang Municipality, the erection of the whole building being carried out by Messrs. Howarth, Erskine and Co.

The acquisition of the adjacent land for extension of styes, as decided on by the Committee, has not been completed owing to the exorbitant rate demanded by the Local Government.

The following table shows the number of pigs killed, the rents received from styes, and total receipts for the last three years:—

	1912-13		1913-14		1914-15
Number of pigs slaughtered ...	18,503	..	13,993	...	19,277
Sty rents	Rs. 4,562-8-0	...	Rs. 4,545-4-0	...	Rs. 4,098-4-0
Total revenue ... ..	.. 23,065-8-0	...	.. 18,538-4-0	...	.. 23,375-4-0

From this it will be noticed that there has been a considerable increase in the number of pigs slaughtered, viz., 5,234.

The price of live pigs still remains abnormally high and consignments continue to be brought in from India.

Attention was drawn to this in my last Annual Report, and

I still think it a matter that might well receive consideration from the Agricultural Department.

Three gangs of coolies were employed for three months of the year to destroy crow eggs, of which 15,585 were actually brought in.

MISCELLANEOUS.

The horses of the fire brigade and the ponies belonging to the Plague Department have been attended as required.

The calves of the Vaccination Depôt have been examined prior to purchase and *post-mortem* examination made on each after being destroyed.

ESTABLISHMENT.

The working of the Department has been considerably handicapped by the non-arrival of the Assistant Veterinary Officer owing to the War, and considering the desperate dearth of officers for the Army Veterinary Corps it is quite problematical when one will arrive.

The general routine has also been considerably upset by men being taken for guard duty, but in every case those remaining have loyally done the extra work required of them.

Certain portions of the establishment were revised in February, the chief items being:—

Consolidation and regrading of office clerks with two additional peons.

Revision of salary of Superintendent, Pig Slaughter-house, and the appointment of a Superintendent at the new Bullock Depôt, Kemmendine.

Abolition of the temporary staff for glanders and farcy and the substitution of a regular permanent staff to deal with all contagious diseases in animals.

Mr. Penfold, Superintendent of Slaughter-house, East, and Mr. Sequeira, Day Conservancy Sub-Overseer, Dalla, who are both over age limit, have each been granted a second year's extension of service.

I am glad to report that the work of the staff generally has been satisfactory.

ARTHUR BLAKE, F.R.C.V.S., D.V.H.,
Veterinary Officer, Rangoon Municipality.

Rangoon,

July 5, 1915.

AMERICAN ACCOUNT OF THE WAR-HORSE BUSINESS.

THE war-horse business, which has grown to enormous proportions since Europe went crazy, is full of remarkable and shocking features, says the *Chicago Tribune*.

It costs, on the average, \$300 to set an Iowa farm horse down back of the battle trenches in good condition. It takes from three to six months to find the horse, sell him a couple of times, until he reaches the agents of one of the European governments, ship him across country in an express train and across the ocean in a big steamer, train him to stand gunfire and to respond to bugle signals and make him ready to "sniff the battle afar off."

Once he gets within reaching distance of the firing-line the horse is killed—on the average—in seven days.

DEAD HORSES USED.

Three months and \$300 gone in seven days! But not quite gone. Back of the fighting columns travel great butcher shops on wheels. As soon as the fighting has died down these big vehicles appear. Every wounded or recently killed horse is promptly picked up and turned into fresh meat for the soldiers. His hide is saved to be tanned into leather and make boots for the men in the trenches.

That is a new lesson in efficiency.

Out of almost every town in the middle west the scouts of the horse buyers are working. Sound mares or geldings that weigh upwards of 1,200 lb. are wanted. They may be any colour but white or grey, which colours are too easily visible to look-outs and aeroplanes.

The scout, arriving in a small town, hires an automobile and engages a local man who knows most of the farmers in the country. They start out early in the morning over the country roads, visit every likely farm, pay cash for all purchases and ask immediate delivery. In a week a good buyer may pick up from forty to fifty horses, which will fill two cars.

SENT TO BIG CENTRES.

The loaded cars are sent across country to the commission merchants at the stockyards in Chicago or to some larger centre.

Here they are first offered to the men who have taken contracts to supply 10,000 or 20,000 horses to one of the foreign countries. Some horses in each shipment are likely to be rejected for military use. Such are then sold on the regular market.

Each horse which is bought by the Army contractor is branded with his mark, usually on the right hoof and the right hip, and turned into a corral with his other purchases. Then the whole herd passes under the eye of the inspector for the foreign government, usually a veterinary surgeon, detailed for the purpose. Such as he accepts are again branded, this time on the left hip, with the brand of the government which now owns the animal. The English brand is a broad arrow. Italy uses an inverted V inside a circle.

MUST BE KEPT TWO WEEKS.

What happens then depends on how soon the next horse steamers are sailing for Europe. At any rate, it is necessary to keep all the horses from two to three weeks somewhere 'near Chicago, where they can get acclimated and rested from the long ride in the freight cars and the excitement of the stockyards.

For feeding horses during this period of rest great central stations have been established outside the various cities which have large horse markets. That for Chicago is located at Calumet Park, south of the city, where there is shed room and feeding space for more than 10,000 horses.

From the feeding centre the horses are sent east to the seaboard in solid trains, which usually run on express time, often reaching Jersey City, for instance, in forty-eight hours after leaving Calumet Park. More than once the big railroad companies have sidetracked their fast passenger trains to give a train loaded with prospective war horses the right of way.

WHAT BECOMES OF CRIPPLES?

Often one or more horses in a car will be crippled by accident during this fast run, and it is always necessary to give them a second inspection before they are put on board ship. Just what happens to horses hurt in transit, and how badly they must be hurt before being rejected, seems to be something of a mystery, possibly concealing vague opportunities for graft.

A horse ship is usually manned by a lot of young fellows who

feel the lure of adventure. Among them are likely to be some new graduates of veterinary colleges. So far as memory serves, steamers loaded with horses have not been attacked by submarines or sunk by mines during the present War. The only horse ship which has suffered disaster seems to have been an Italian vessel carrying 800 horses, which caught fire in some mysterious way and was burned at sea.

SEVERAL TRAINING CAMPS.

Each of the warring powers has several training camps for war horses. On the voyage across the Atlantic a number of horses are almost certain to be crippled by accident or through disease. Those remaining sound are ridden or led to the camp, where their final training for military service begins.

Farm horses from a thousand farms in the middle west are tied in rows to long ropes, which are supported by stakes driven into the ground about twenty feet apart. Two such rows face each other and their hay and other provender is carried down the centre between them and eaten off the ground.

Here the farm horses are taught to respond to bugle calls and other signals and are gradually accustomed to the sound of firearms, small and large. Horses destined for the cavalry are, of course, given a different training. It takes usually a couple of months to train them sufficiently to be of any use in actual operation.

THEN TO FRANCE.

From England the prospective war horses are taken across the channel to France. Once in real war service they survive from four to ten days. Then it is a case of fresh meat and sausage.

So far, the official figures of the Government show that about \$50,000,000 has been invested in American horses by the warring powers. At the fair average price of \$200 that would represent 250,000 horses. Big as that figure is, the last census showed that there are something like 20,000,000 horses in the United States and anything like a horse famine is apparently far off.

Mules the men of war are not buying in large quantities. Only about 40,000 mules have so far gone out of the country. The reason is said to be that a mule will not face gunfire. When the guns begin to roar the mule wheels and runs.

THE LATE CAPTAIN M. STEVENSON, M.R.C.V.S.,
A.V.C. (T.).

WE very much regret to announce the death at the Hospital, Albassia, Egypt, as a result of wounds in the head, of Captain M. Stevenson, one of the best-known veterinary surgeons in North London. He was 49 years of age. He took his diploma in Glasgow in 1888.

We append the following notice, contributed by a correspondent, of a distinguished member of our profession, and a gallant officer who has died gloriously for the country:—

"Captain Stevenson, who served in the Boer War, offered his services at the outbreak of hostilities in August, 1914, and immediately went to France with the Army Veterinary Corps. He was home the following month, having been injured during a stampede of horses, and on his recovery he returned to the Front. He was not back in England again till March, and a fortnight after his return he was transferred to Egypt. He wrote home in the cheeriest strain from time to time, and he sent a number of portraits which indicated that not only horses but camels were under his care in that country. A fortnight ago his wife received a cable which stated that he was very bad and had been taken to the Anglo-American Hospital at Albassia. No further news was received until the intimation of his death. Captain Stevenson had practised as a veterinary surgeon in London for about a quarter of a century and his skill in the treatment of animals was appreciated among all classes of society. He was a familiar figure at the Highgate Police Court, as he was invariably called by the police authorities to give evidence in cruelty cases. In this connection many kindly acts stand to his credit. He would always forego his fee in cases where poor men had been victimized in purchasing animals, and on more than one occasion he was instrumental in securing for them a better beast than the one which the magistrate had ordered to be destroyed, and he frequently gave a helping hand to boys who expressed a wish to learn farm work by offering them employment on his farm at East Finchley. Mr. Stevenson was the winner of the International Leaping Contest, which was held at Rouen in 1892, and thus earned the title of champion jumper of the world. Mounted on a horse called Tasmania he defeated twenty-five of the best-known English, French, Spanish, and American horses, and in addition to winning the title of champion he took a prize of £1,000. He was the veterinary surgeon, too, who ordered the destruction of Holocaust when it was injured in a race for the Derby with Tod Sloan up. Mr. Stevenson was an Irishman, having been born in Tipperary, and he had all the geniality and good humour which characterize that race."

ARMY VETERINARY SERVICE.

(Extract from "London Gazette.")

B. W. BLOMFIELD to be Lieutenant (September 9).

Major E. E. Martin to be temporary Lieutenant-Colonel, while holding appointment of Assistant Director of Veterinary Services (February 6); Lieutenant-Colonel H. W. Pitchford, Natal Permanent Staff Defence Force, to be temporary Lieutenant-Colonel (July 16).

To be temporary Majors: Veterinary-Captain B. B. C. Rees-Mogg, 1st Life Guards (August 7); Captain W. G. Barnes, T.F. (August 16).

To be temporary Lieutenants: F. J. Pringle (August 24); W. J. S. Foley (August 26).

Captain R. Finch, New Zealand Army, Veterinary Department, to be Captain (temporary) (September 10).

C. Budd to be temporary Quartermaster, with honorary rank of Lieutenant (September 10).

J. Nagle to be temporary Lieutenant (July 20); G. C. R. Thorp to be temporary Hon. Lieutenant (August 23).

To be temporary Lieutenants: J. F. Donelly (August 3); W. H. Tummonds (August 8).

Lieutenants (on probation) confirmed in rank: R. Moore, G. C. Lancaster, J. G. T. Edwards, F. C. Minett, R. Daubney, M. G. O'Connell, P. T. Saunders, D. Marshall, H. S. Cockburn, E. H. Wyly, L. A. Auchterlonie, C. J. C. Ryan, H. J. Lowe, R. Wooff, H. L. Torrance, J. Fox, S. C. Rowbotham, D. C. Greene, H. McC. Johnston, J. A. Ward, S. Hunter, J. J. Hegarty, J. J. Dunlop, W. McG. Mitchell, M. F. O'Sullivan, T. T. Taylor, D. Blythe, A. V. Nicholas, W. H. Wortley, G. A. Roberts, S. H. L. Woods, C. Tracy, W. E. Footner, R. J. Forrest, T. M. Mitchell, W. J. Bambridge, P. D. Huston, P. S. Sparling, B. J. W. Nicholas, T. W. W. Wright, J. O'Carroll, R. T. Smith, H. B. Williams.

Temporary Lieutenant F. B. Barling relinquishes his commission on termination of engagement (September 11); G. H. Broad to be temporary Lieutenant (September 1).

W. B. Cronyn to be temporary Lieutenant (September 1).

Temporary Lieutenant A. S. Leese to be temporary Captain (September 15); R. G. Gray to be temporary Lieutenant (August 17).

Lieutenant J. Bell to be temporary Captain (August 27).

J. Paul to be temporary Lieutenant (August 11).

Major W. G. Dixon resigns his commission on account of ill-health (August 26).

Lieutenant E. H. Fisher resigns his commission (August 24).

C. F. Shawcross to be Lieutenant (July 15).

DISEASES OF ANIMALS ACTS, 1894 TO 1914.
NUMBER OF OUTBREAKS AND OF ANIMALS ATTACKED OR
SLAUGHTERED.
Great Britain.

(From the Returns of the Board of Agriculture and Fisheries.)

DISEASE	AUGUST		EIGHT MONTHS ENDED AUGUST	
	1915	1914	1915	1914
<i>Anthrax—</i>				
Outbreaks ...	25	36	418	518
Animals attacked ...	27	42	478	564
<i>Foot-and-Mouth Disease—</i>				
Outbreaks ...	—	3	—	14
Animals attacked ...	—	17	—	91
<i>Glanders (including Farcy)—</i>				
Outbreaks ...	4	5	36	73
Animals attacked ...	6	7	65	219
<i>Parasitic Mange—</i>				
Outbreaks ...	45	18	*580	1,521
Animals attacked ...	89	20	*1,260	2,633
<i>Sheep-Scab—</i>				
Outbreaks ...	2	3	161	153
<i>Swine Fever—</i>				
Outbreaks ...	246	222	2,993	2,821
Swine slaughtered as diseased or exposed to infection ...	982	1,421	13,342	28,939

* Figures for five months only, the Parasitic Mange Order of 1911 having been suspended from August 6, 1914, to March 27, 1915, inclusive.

Ireland.

(From the Returns of the Department of Agriculture and Technical Instruction for Ireland.)

DISEASE	AUGUST		EIGHT MONTHS ENDED AUGUST	
	1915	1914	1915	1914
<i>Anthrax—</i>				
Outbreaks ...	—	—	1	1
Animals attacked ...	—	—	1	1
<i>Foot-and-Mouth Disease—</i>				
Outbreaks ...	—	—	—	76
Animals attacked ...	—	—	—	957
<i>Glanders (including Farcy)—</i>				
Outbreaks ...	—	—	1	—
Animals attacked ...	—	—	3	—
<i>Parasitic Mange—</i>				
Outbreaks ...	9	7	53	62
<i>Sheep-Scab—</i>				
Outbreaks ...	22	15	290	390
<i>Swine Fever—</i>				
Outbreaks ...	13	16	175	158
Swine slaughtered as diseased or exposed to infection ...	90	107	1,000	819

Review.

Special Cattle Therapy. By Mart R. Steffen, M.D.-C.V.S. Veterinary Medicine Series, No. 7. Edited by D. M. Campbell, D.V.S. Chicago: *American Journal of Veterinary Medicine*. 1915. Cloth bound, 158 pages. Price 1 dollar 50 cents.

This is the latest volume of the Veterinary Medicine series edited by D. M. Campbell, D.V.S. It is a valuable little book which, while not ranging over the whole field of cattle ailments, yet gives terse descriptions and reliable advice concerning bovine diseases which are occurring every day. The therapy advised is up to date and quite likely to be effective, and we are pleased to notice the writer's advocacy of such drugs as the triple sulphocarbolates and salol instead of the drastic, irritant and nauseous agents that are frequently given to cattle. We appreciate the lines—"bovine therapy is a speciality of veterinary medicine which offers a considerable field for the development of improved and enlightened methods of treatment." Would that all practitioners would look at it in this way. That the author has been an acute observer in the field about which he discourses is proved by the fact that he gives the first written description we have seen of "Thurrow's disease" in cattle, and also notes a condition which he names "persistent anorexia," which most cattle practitioners have seen in their time but have not generally christened. We have encountered the condition known as Thurrow's disease on two occasions during the last four years, and it has puzzled us. We have not noticed the tremendous enlargement inferred by the author when he states that "the animal bears but little resemblance to a cow," but we have seen a wind baggy condition of the patient at many places and easily detected air crepitations under the skin. The state might casually be mistaken for black-quarter, but careful examination and the fact that death from the disease is very rare will differentiate it. The author does not give any opinion as to its etiology or pathology, which is regrettable. Acute simple agalactia and its treatment will appeal to all veterinarians who have dairy practice. It is a condition that needs wise handling, and the practitioner dealing with it skilfully and successfully will gain much credit.

There are various tips in the book that the clinician can put to the test of experience in his diagnosis of disease. If all of them turn up trumps, then the recognition of ailments by their symptoms will be easier for some of us than it has been. In

this connection we notice the author's bovine sign of a dead foetus in utero and that of impaction of the rumen, &c. Impaction of the omasum is ignored. Is it because it does not occur?

We heartily commend the little book to all cattle practitioners. It is handy, useful, interesting, and will widen the clinical and therapeutical horizon of most of us. The author has for some time edited the Therapeutic Digest Department of the *American Journal of Veterinary Medicine*, so that he is an experienced man in this branch of science. All his descriptions are given in typical breezy American style and are well worth reading, and all his treatments show evidence of thought and insight and a determination to advance in that branch of knowledge upon which he dilates. Cattle practice in future years should increase and this book, if intelligently read and interpreted, should help to extend the veterinarian's practice among cattle. G. M.

LITERARY NOTE.

MESSRS. HURST AND BLACKETT will publish immediately a new edition (the eighth) of Captain M. Horace Hayes's standard work, "Veterinary Notes for Horse Owners," an illustrated manual of horse medicine and surgery, written in simple language. First published in 1877, this notable work has for thirty-seven years maintained its supremacy. The late Captain Hayes has been universally recognized as the most competent authority on matters relating to horses, but it is owing to the fact that his "Veterinary Notes" has from time to time been thoroughly revised and brought up to date, as edition has succeeded edition, that the work has never lost its position. Now that a new edition has been called for, every care has been taken not only that every statement shall be accurate and authoritative, but that all the latest knowledge shall be utilized, the whole work has therefore been entirely re-set.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.

THE VETERINARY JOURNAL

NOVEMBER, 1915.

Editorial.

WHAT'S YOUR HURRY?

A GREAT surgeon once told his students: "A man may bleed to death from a severed carotid artery in three minutes. You can tie this artery in two minutes *if you are not in a hurry.*" Is not the hidden meaning here that efficiency may only be secured without undue haste and that agitated hurry often leads to ineffectiveness and bungling? To think quickly, to act skillfully, to do effectively without being in a flurry or hurry are valuable and essential attributes of the successful surgeon and medical man no less than of the leader in business circles. The full carrying out of detail needs an intellect that works in orderly fashion. The mind must act with the hands; if the former gets much in front of the latter muddle will result, and if hands work in front of eye and mind we shall see unintelligible surgical hieroglyphics, and confusion will be apt to become worse confounded. In a world where unseemly hurry seems to be prevalent on every hand a word may be written in defence of a check on mere apparent speed. Most lasting and permanent things that are of value have been somewhat slowly created and constructed. The foundations of any safe structure are not jerry-built.

In connection with research we see accounts of conclusions quickly come to on subjects of which formerly it has taken years of inquiry and investigation just to scratch the surface. The findings are in direct opposition to those of previous labourers on the same subject in the like fields. Is it not probable that

research in a hurry is likely to be fallacious as regards its results? Steam was discovered before engines were built. If an engine, however beautiful, is constructed and the provision for the effect of steam overlooked the locomotive is not likely to go. If a fountain is built and the supply of water to it be forgotten there will be no perfectly formed or scintillating sprays of liquid. Supposing the object of the fountain to have been overlooked in the hurry to construct it, water brought to it in buckets at the last moment and forced through its jets will be a poor substitute for conduction pipes, make a bad scenic effect, and only lead to an inglorious and painfully interrupted spectacular display.

We are to-day seeing a picture of a country in a hurry, full of troubled energy without any definite action, knowing not what permanent effect it is out to produce, and regardless of the aftermath. It is thinking and acting like a confused man who is not master of his job, and no lasting good result will accrue to it for all its expenditure of effort.

Turning to another side of operations in a neighbouring region, what a splendid result for organized well-thought-out action we see in the activities of the Army Veterinary Corps. We are told by men who are no novices and who have seen things that the young veterinary surgeons at the Front "have indeed developed a real talent for quick and efficient surgery, even under fire." Attention to detail, good organization and dispatch without hurry have contributed to bring about the grand figures of 47,192 horses cured and rendered fit for military service again out of a total of 81,134 injured and incapacitated in the campaign.

Even in ordinary practice the call to a serious case of accident brings into play the faculty of quickness without undue haste and well-directed thought before action. The mind must run over everything that will be required to deal promptly and well with the emergency. If the needles be taken without the silk and the dressing without the needles, the hurry in getting to the case will merely be an example of misapplied effort. Energy is often mistaken by the ignorant for action. A message given by telephone in a hurry and without due thought often makes the summons only a call to the wind. Badly initiated and mis-directed hurry makes slow progress in the wished-for direction and is liable to encounter pitfalls by the way.

In the little world of veterinary politics it is questionable whether undue haste has not occasionally militated against effectiveness. Productive technical, legal and political knowledge have to be gained by experience, and perhaps an intimate understanding of human nature is as important an element towards the achievement of success in these fields as it is in other walks of life where the human item is involved. Experience must always act as the perfecter of effective action. A man may be a poor pathologist, an indifferent clinician, a somewhat erratic surgeon, but given the will to advance and some years of work in his calling then his experience will always be worth listening to and taking the measure of. Complete theoretical knowledge tends to check the ineffectiveness of futile hurry and to produce instead co-ordinated action, all the parts of which work quickly, smoothly, and successfully together.

It is little satisfaction to us to hear practitioners, whether human or veterinary, glory in the number of cases they have visited in a day, the large aggregate of their operations as ordinary members of the profession, without being experts. We often wonder whether in their hurry many of their activities have not been useless or imperfect. The human machine can only accomplish a certain amount of work well in a given time. It cannot keep going at full speed perfectly and indefinitely. "One thing at a time and that done well is a very good rule as many can tell." In some neighbourhoods the best men are scarce, the general public accommodating and undiscerning, and there is a good time for him to whom Nature has given ne'er to be harassed, an unseeing eye, and a front unembarrassed.

There is something still to be said and written in favour of the good old motto, "*Festina lente*" (make haste slowly).

Many critics have given their views on our nation's operations in the Dardanelles. The futile hurry when the Fleet acted without the land forces has been condemned and its lack of success deplored. Those who think ahead may still believe that if that hurry had been successful we should almost certainly have been faced with similar distressing experiences to those of Lucknow and Khartoum.

G. M.

THE ANGLO-FRANCO-BELGIAN VETERINARY
RELIEF FUND.

WE can understand in a measured degree the position of our *confrères* in Belgium and Northern France who at one fell swoop have lost their homes and practices. It is characteristic of Britishers that they should not only be the friends of small nations, but also show practical help and sympathy with their allies and near neighbours in their misfortunes. A fund is to be started with the main object of repatriating and re-establishing in practice our unfortunate professional brethren. Notwithstanding that there are heavy calls on most of us in many directions at the present time, we hope that this fund will gradually grow so as to become a real help to those in need. No cause could appeal to each one of us more forcibly than this one and no object is worthy of more sympathetic and whole-hearted support.

LOCKJAW.

So far tetanus has been the greatest bugbear to the German surgeon, and Professor Czerny has stated that among 60,000 wounded Bavarians 420 developed tetanus and 240 died of this disease. In the military hospitals of Strassburg 14 per cent. of all the deaths were due to tetanus. It is believed that the great frequency of tetanus in this war is due to the trench fighting in heavily manured districts, where the infected soil often remains in contact with a wound for hours and even days before anti-septics can be applied. The fact, too, that the lacerated wounds caused by shell and shrapnel are relatively more common in this war than the wounds caused by rifle bullets may also partly explain the greater frequency of tetanus. The Germans have experimented extensively with anti-tetanic serum, but they are not convinced as to its merits. Some silly accusations have been made in the German medical press by surgeons who have noticed a greater frequency of tetanus among their own men than among the French, and who have accordingly declared that French bullets must have been intentionally infected.—*Manchester Guardian*.

General Articles.

HOG CHOLERA, AND THE VETERINARIAN'S RELATION TO SAME.*

By F. B. WHITFIELD, D.V.M.

Dothan, Ala.

THE above subject has been given me on which to write a paper for reading before this association. Though the name is a short one, gentlemen, there is embodied therein some of the most vexing and some of the hardest problems confronting the veterinarians of this State. It is a subject of the most vital importance to the farmers of our State in the live stock business, and also to you, the veterinarians of the State, who are depending on the farmer for a living. The more you see of this plague that is sapping the profits of a great industry from your people, keeping them handicapped in the production of food, the harder you should fight for its extermination.

Let us look into the cause of this dread, contagious disease which is annually destroying from fifty to sixty millions of dollars' worth of our animals, making empty, as it were, hundreds of thousands of pork barrels each year. We are told by the bacteriologist that this disease is caused by an ultramicroscopic organism which has never been seen by the most powerful microscope.

The causes which we are most interested in, however, are those which foster the spread of the disease, in other words, the predisposing causes. Among these we will mention the following: State and county fairs, streams, buzzards and other birds, hog buyers and sympathetic neighbours, and last, but not least, the patent medicine quack.

Many outbreaks can be traced to the fairs, for it is here that many hogs are brought together from all parts of the country, with little regard sometimes as to their condition or the health of the animals in the neighbourhood from which they came. An infected animal bought by the farmer from such a place may cause the loss of thousands of dollars' worth of hogs by being placed in a healthy herd. It is strange to see so many farmers, who seem to be intelligent men, make this mistake.

* Read before Alabama Veterinary Medical Association, Auburn, Ala., March 26 and 27, 1915.

As to streams carrying this disease, I am sure that if you gentlemen could be with me in Houston County, where each man has a small stream running through his lots, you would be surprised at the number of cases that you would see transmitted in this way. Around a little town of Madrid in our county there are a great many of these streams, and on one occasion I went down there, during an outbreak of cholera in that community. Dead hogs could have been seen lying unburned out on the ground and in the streams, where the animals had gone to die. The stench in some localities was most repulsive, and the air was, we will say, black with buzzards. These products of decomposition were swept down the stream to infect herds many miles away. These same buzzards could fly with other birds to other sections of the country, and in this way infect the herds in the lots in which they would light to feed on other carrion. The dogs of the section in which such an outbreak occurred, by dragging the pieces of the dead animals from place to place, could scatter the infection.

Many cases of hog cholera are scattered by farmers borrowing the boar of their neighbour for breeding purposes. One of my clients, Mr. Crawford, of Dothan, loaned his fine boar to a neighbour for breeding purposes. This animal contracted the disease in two weeks. It is of utmost importance that we know from whence hogs come that we use for any purpose, and it is all the more important to know where our hogs go when we do loan them.

One of the hardest problems which the average veterinarian encounters in handling this disease is the way the farmers have of letting their animals run at large. By this method I am sure many herds are contaminated, for we well know that to handle any infectious disease it is highly necessary to quarantine any and all infected animals and the premises on which they are quartered, keeping other animals away from them. Many cases of hog cholera are started by neighbours who flock to the farmer's house and to his lot to offer any assistance, which they are always too eager to render in cases of this kind. They go into the lots, handle the animals, get the excreta from the sick ones on their feet, go back into their lots, and in this way scatter the infection among their well animals. The hog buyer in like manner carries the infection.

In no other case do I believe that the vendor of worthless medicines should receive heavier condemnation than is due that man who would, for the gain of a few dollars, deprive his fellow man of thousands of dollars' worth of property and food for his family. Gentlemen, I refer to the patent medicine quack. May his stay with us be short and be terminated as speedily as possible. Already it seems that we can hear his death-knell ringing, for with the men that the colleges of veterinary medicine are turning out each year in the field of service, Mr. Quack is going to the wall. He slips around guaranteeing cures with his wonderful hog cholera medicines, knocking the use of serum, and in this way prejudice against any treatment that may be good, is established by his failures.

Having determined some of the causes of this disease, let us briefly enumerate the symptoms. In the acute form we find that the following symptoms manifest themselves: There is marked rise in temperature, from 104° to 108° F. Loss of appetite and general depressed condition. The hog isolates itself from the herd and lies around burrowed in the straw and litter; exhibits a stiff, sluggish manner, being in a weak condition. First we may notice that the bowels are constipated, and later diarrhoea may set in, this diarrhoea being of an offensive odour. A hacking cough may be present, and the animal's breathing may be considerably accelerated. The eyes may have a mattery discharge, and in some cases I have seen the animal seems to be affected with gastritis, as evidenced by the vomiting of glairy material from the stomach. He loses his appetite, and seems in some cases to be very thirsty as a result of the fever. In the chronic form the skin of the region of the belly assumes a parched appearance. These blotches may later be the foci for sloughing sores. I have seen these sores crust over in the hog that is recovering from the disease, these scabs falling off and leaving the skin covered by them denuded of hair. The urine may assume a dark colour as in other febrile diseases.

As to the period of incubation of this disease the time varies, but from observation it is safe to place the estimate at from three to twenty-one days.

In this, as in other disease, our most trustworthy method of diagnosis consists in making a careful *post-mortem* examination of the carcase. In *post-mortem* examinations we may find the

following lesions: splotches or sores on the skin. These splotches may be found in most cases under the belly and between the legs. There may be a purulent conjunctivitis. Upon opening the body cavities we find the following lesions: The stomach presents a congested condition of the mucous lining, and small hæmorrhagic spots are seen. In the large intestine in the chronic form of the disease we find the characteristic button-shaped ulcers; a great many times near the ileo-cæcal opening; but in the acute form these are absent, and instead we see a congested mucous membrane. There may be a diffuse enteritis in the small intestine. The spleen in the cases that I have examined was in some cases congested, while in others there was very little change. The kidneys present in most cases small petechiæ, while in some cases this organ may be studded with red spots. The lymphatic glands are of a dark congested consistency, the black blood oozing from them on being cut into. The bladder may present cystitis. In the swine plague form the lungs are congested very much as in pneumonia. There may be small petechiæ around on the serous walls of the thorax.

Now comes the process of treating hogs in this disease. Here we may say, more than in any other disease with which we have to deal, that "an ounce of prevention is worth more than a ton of cure." This is perhaps the largest field of preventive medicine that the veterinarian of Alabama can be engaged in. As to the *Serum Simultaneous System* of vaccination, we can but repeat the words which, in a joking way, have been attributed to that famous old explorer, Balboa, who, as he looked out over the great Pacific Ocean, said, "Well, boys, it is a success." This preventive treatment has passed from the age of experiment and is now known to be a well-established and successful preventive.

As to the time that is suitable for the use of the simultaneous treatment for the prevention of hog cholera, I believe that it should be done as soon as the animals weigh 25 lb. to 50 lb. I believe that it is best to vaccinate all hogs in the herd as soon as they are large enough. In this way we are able to do it at the least cost, and thus the farmer can render his animals immune to the disease for all time. When the disease is in the neighbourhood it is imperative that the animals should all be inoculated. A great many farmers will put the work off until cholera gets into their herds and then come running to you for advice. In

this case, when the weather warrants it, I tell them to go home and kill all the hogs that they intend to use as food, for the use of the serum has not, in my practice, proved successful in that stage. One thing which is essential for the man's success in raising hogs, who does not vaccinate them as they become of the proper size, is to watch his neighbours' hogs as well as his own, for in this way he can determine when any animals around him are sick, and can then go to work with the serum treatment before it is too late. I would recommend that the early treatment be given all animals that a man is raising for breeding purposes, for in this way he can build up a reputation for raising animals that are immune and in this way build up his business.

In my work I have good results by using the *Serum Simultaneous* treatment in the following manner: The first essential to success is cleanliness always. I use a 30 c.c. syringe of the all-metal type for the serum and a small 2 c.c. syringe for the virus. The disinfectants I use are creolin and iodine. A small, ordinary drinking glass is used to hold the serum and an ordinary tin bucket is used for the creolin solution and cotton. The iodine is used on a cotton swab. A small pan with creolin solution is used to hold the syringes. With two good, strong assistants the animal is secured, being careful not to injure it, especially in the case of pregnant sows, for I believe that rough handling of pregnant sows is directly responsible for abortions which occur sometimes after treatment. Next I clean off the space in the axillary region of the limb with the creolin solution. Next the iodine is painted on the surface, which has been dried off with a piece of cotton. Next the serum is injected into the loose area in the axillary space, the dose being drawn into the syringe and measured by the graduated scale on the plunger. The needle is withdrawn and the skin pinched at the point of injection to prevent the escape of the fluid from the puncture. Next I inject the prescribed dose of virus after cleaning a point on the inner surface of the ham. The animal is now turned into a clean lot.

In herds where the disease is present I use only the *Serum Treatment* in those animals which show hypothermia. The others are given the *Serum Simultaneous Treatment*. My success in herds in which the disease has already broken out has not been very marked; nearly always 50 to 75 per cent. of them

have died. Some of the bad luck I have had I attributed to impotent serum. My advice is to use the serum which has proved successful, even though some other firm may offer you special inducements in the form of commissions to use their products; for by the use of an unreliable serum you may place the use of serum in bad repute, and in this way injure the prospects for the eradication of the disease and be detrimental to your business as well.

Below I will enumerate some of the cases observed by myself:—

Herd No. 1, A. D. Whiddon, Owner.—These animals were given the serum simultaneous treatment because there was an outbreak of cholera near. Two of them were left unvaccinated. These two animals died, the others remaining healthy.

Herd No. 2, Mr Patterson, Owner.—In this case a neighbour's herd above his on a creek died of cholera. The infection, no doubt, was carried by the creek to his place. I vaccinated the herd belonging to Mr. Patterson. The animals in this herd all succumbed to this disease, except five out of the seventy vaccinated. The serum only was used in this case.

Herd No. 3, Mr. Daughterty, Owner.—These animals were on the same creek which watered the animals owned by Mr. Patterson. They were not vaccinated at all, and about 75 per cent. of them died.

Herd No. 4, G. W. Pilcher, Owner.—This herd, consisting of twenty-five head, were vaccinated before placing on peanuts left by hogs which had died from cholera. These animals have not contracted the disease yet, and the time when they were vaccinated was about two months ago.

Herd No. 5, Mr. Crawford, Owner.—These animals were infected by the loan of a boar which became infected and subsequently transferred the infection to the herd on being replaced after the neighbour had used him.

Herd No. 6, Ed. Cannady, Owner.—These animals were given the serum simultaneous treatment with the exception of one that was sick at the time of administering the treatment. He received a double dose of serum and recovered; the remainder did well.

Herd No. 7, Mr. Sanders, Owner.—These animals were sick at the time. Gave serum alone. Lost one-half of them.

Herd No. 8, Mr. Sanders, Owner.—Gave these simultaneous

treatment. None sick. One of these died with cholera in two weeks.

Herd No. 9, Mr. Rogers, Owner.—Vaccinated 100 for him. None sick at time of vaccination. No bad news from them so far.

Herd No. 10, Mr. P. C. Bradshaw, Owner.—Cholera all around him. Twenty-five animals inoculated. All well.

The following is a table giving the dose of serum and virus used in this work, together with the weights of the animals:—

Weight of hog lb.			Serum c.c.			Virus c.c.
20	...	...	20	...	...	$\frac{1}{4}$
50	...	...	25	...	...	$\frac{3}{8}$
75	...	...	35	...	...	$\frac{1}{2}$
100	...	...	50	...	...	$\frac{3}{4}$
150	...	...	60	...	...	1
200	...	...	70	...	...	$1\frac{1}{4}$
250	...	...	80	...	...	$1\frac{3}{4}$
300	...	...	90	...	...	2
350	...	...	100	...	...	2
400	...	...	110	...	...	2

In giving the farmer advice on the subject of hog cholera it would be well to enumerate the following points: Keep your premises clean. Water your stock from your own well if possible, and if your well does not hold enough, dig it deeper, for we can dig wells or bore them with a lighter heart than in digging graves. Do not borrow your neighbours' animals. Keep people out of your lots and attend to your hogs yourself. Watch your neighbours' animals so that you can tell when your hogs will be in danger. If your animals die from cholera, do not go and buy more and place them in the same lot unless they are given the simultaneous treatment. Do not throw your hogs out on the open ground, but burn the hog and a stump at the same time, thereby killing two birds with one stone. Raise hogs that are worth the money spent in vaccinating them, and then you will not stop to consider the cost of serum treatment too long. Beware of hog cholera cures as sold by quacks. If you want information, go to your veterinarian at all times and ask him about different diseases of hogs. If he is not interested in your welfare enough to talk to you, and does not seem to want to help you, cut him out and get another man to do your work. If your hogs have cholera tell your neighbours, so that they can profit by the information which you have given them. Feed cooked feed at all times. Vaccinate your hogs before they have an opportunity to contract the disease,

and in this way ensure them against cholera. Do not buy hogs from around in the country unless you know what you are getting. When you do buy them, place them in a pen by themselves until twenty-one days have passed. Then, if they are still well, use them in your herd. This particularly refers to boars. Be careful to know that there is a rigid system of inspection at the fairs before you show any animals there. Bury all dead animals on your place and this way keep buzzards away. Study the method of vaccination and learn to do it yourself, having first learned under the directions of some veterinarian. Know that at all times success in the hog business, as in all others, is only attained by close attention to details and the study of your business.

Right here I may say, gentlemen, that one of the worst things with which we have to combat is the ignorance of the average farmer. We are vexed sometimes at the strange things they will do when we do not stop to think that most of them have no training in the prevention of infectious diseases. The average farmer in our State will talk politics for hours, and then, when he gets his man elected, knows nothing of the duties which he is expected to perform. Few indeed know that they hire a congressman to work for them as their public servant. He does not seem to know that to get the best information possible he has only to write for bulletins on work that this Government has spent thousands of dollars in hiring men to acquire the knowledge which may be gleaned from them.

Another thing which we have to fight to a finish is the patent medicines which are guaranteed under the pure food and drug laws of our country. Our great Government sees fit to permit this stamp placed on thousands of worthless nostrums, and I am sure that this very thing has done a great deal to keep our work along this line from being effective. Uncle Sam may spend his thousands in hiring experts, but as long as he permits such things as this he spends his money in vain; for with a farmer once fooled by some patent hog cholera medicine or serum, it is the hardest thing in the world to convince him that the serum made under the Government's direction is good. Fool him once, and you have a chronic grouch on your hands.

In fighting the disease first get the confidence of your man. Let him know that you have his interest at heart. Tell him the

cause of the disease, and point out the road he is to follow in combating it. Whenever you vaccinate animals for a client, try to have his friends there to see it done. Give them a little talk on the disease, and speak in terms that they can understand. When you are doing the work for an intelligent man, offer to show him how it is done, and under your directions let him do some of the work himself. Some here will say that this is taking money out of your own pockets, but stop and think what the financial condition of this country would be if every farmer had, say, twenty-five hogs to sell yearly made possible by this vaccination. I have men in Dothan whom I know, who have been inoculating their hogs for years, and as a result of this they are making money on them. You can rest assured that the man who sells his hogs will always have money with which to pay you for your trips, and you all know that the sweetest sound to a veterinarian's ear after the patient is out of danger is the rattle of the cash in his pockets.

The last Legislature of our State has seen fit to establish a hog cholera serum plant in Auburn. For this plant we are indebted to our State veterinarian. He has worked for years on this one thing, and at last it seems that his labours are to be crowned with success. We may stop and ask ourselves, "What does the establishment of this plant mean to the people?" It means this: More hogs and better hogs. More meat for our people and better fed people. The opening of another field of production for our farms. Less cotton and higher prices. Another product to be shipped and greater prosperity for our State.

In my opinion, and I believe I may add in the opinion of all veterinarians here present, this fight for the eradication of hog cholera is the most important one we are waging. The people of Alabama are large meat consumers and small producers. Hundreds of thousands of dollars' worth of western meats are shipped into our State which we could raise at home. The use of serum in eradicating this disease has proved a success in other States, and it will in ours. The present conditions demand that we raise more and more food products for our people. Gentlemen, the *American Hog* is one of the most important of these crops, and on him, to a great extent, hinges the prosperity of our people. It has been demonstrated that we can raise hogs

as cheaply as in any section of this nation, and it is up to us, the veterinarians of this State, to render any and all the assistance possible to our greatest friends, and I may say the greatest people on this earth, the American farmer. Upon them you depend for your living, for, with the advent of the gas engine and automobile, your city business is fast falling away; as the horse in the city is doomed and those owned by our country friends are our only salvation. Therefore, let us keep these resources in as good condition as possible.—*American Veterinary Review.*

ANTHRAX IN ELEPHANTS.

By M. C. GUPTA.

Veterinary Surgeon, Toungoo, Burma.

It is one of the most formidable diseases occurring in elephants. Considering the everyday difficulty in purchasing elephants for timber firms in Burma and the high price one has to pay to secure a really good beast for dragging timbers, it will not be out of place to discuss the subject. The mortality from this virulent disease amongst the elephants is still very high and now is the time to find out proper scientific methods to eradicate it as far as possible.

Definition.—An acute infectious disease caused by *Bacillus anthracis*.

Etiology.—The infectious agent is a non-motile, rod-shaped organism, *B. anthracis*. The bacilli themselves are readily destroyed, but the spores are very resistant, and survive after prolonged immersion in a 5 per cent. solution of carbolic acid, or withstand heating for some minutes in a temperature of 212° F. They are capable also of resisting gastric digestion. Outside the body the spores are in all probability very durable. The disease is conveyed sometimes by direct inoculation—more commonly by grazing in pastures contaminated by the germs. The spores may also be carried by the wind and in water. Local wounds and sores may also be infected by being brought into contact with the anthrax virus by the agency of flies. In the fodder the spores lie dormant for years.

The incubation period is generally from three to six days.

Symptoms.—(A) External, including (a) malignant pustule, and (b) cedema. (B) Internal: (a) intestinal, (b) pulmonary.

Malignant Pustule.—The pustule begins with an itching at a spot which soon becomes a livid red papule and vesiculates and forms a rough, black, central slough, usually surrounded by a zone of small vesicular pustules. It is early surrounded by an area of brawny inflammatory cedema, which varies greatly in extent according to the severity of the attack.

Cedema.—It appears soon after the animal shows the first symptoms, sometimes it is visible before any constitutional symptoms set in. Neighbouring glands are inflamed, especially in the places behind the parotid glands, between the limbs, groin, shoulder-joints, belly, or hind-quarters.

Briefly, the general symptoms are pains, dyspnœa, restlessness, with early prostration, paralysis with tottering gait. The attack is sudden with violent shivering or trembling. The temperature usually rises between 102° F. and 104° F. Frequent urination, urine foetid. Sometimes intestinal colic attended with voiding of dark liquid or blood-stained evacuations. The symptoms in the *internal anthrax* are generally the same as described above, but without any swellings.

Diagnosis.—The malignant pustules, once one has seen them, give no difficulty in diagnosis, and if the pustule is not typical the intense brawny infiltration all round gives one the clue, and the bacilli are easily found under the microscope in a smear of the serum from a pustule.

The cedema or swelling increases in size rapidly and is hot, painful and doughy.

In any suspicious case the diagnosis may be rapidly made after the death with the microscope by cutting the ear and obtaining a blood smear, which shows the typical bacilli. But it should be remembered that the blood slides must be taken either an hour before or an hour after death. The anthrax bacilli invade the blood-stream shortly before death, and after death putrefactive organisms which resemble anthrax bacilli enter the blood-stream.

The *internal cases* are very puzzling, if one is not expecting them, and frequently cause sudden death. When seen in the collapsed stage they can hardly be diagnosed clinically. Fortunately these cases are few in comparison with external ones. The pulmonary form is very uncommon amongst elephants, and I have not come across a single case yet.

DIAGNOSIS OF ANTHRAX FROM BLOOD SAMPLES.

Owing to the importance of the subject, it will not perhaps be out of place to review a method of technique for the preparation, fixing, and staining of a blood film.

(a) The Slide.

In the first place, perfectly clean good glass slides are absolutely essential. These when produced and unsoiled must not be fingered and exposed to dust. They should be kept in a tightly stoppered bottle containing absolute alcohol, and when they are withdrawn for use, if not immediately required, they should be placed between two pieces of clean paper to protect them from the dirt and the dust which would otherwise rapidly reach them. Old slides may be cleaned by washing in soap and water, boiling for some hours in strong washing soda, re-washing in clean water, drying, bathing in strong sulphuric acid for three or four hours, washing gently and slowly, but thoroughly, in clean water, drying and stoving in absolute alcohol as above.

(b) The Ear-prick.

The ear of the elephant should be cleaned with soap and water to remove dirt which might otherwise give rise to crenated corpuscles, and then dried. A small droplet of blood should be produced and transferred to the slide.

(c) The Spread of the Film.

The technique of the smear is all important. It matters not what form of spreader be used, so long as the results obtained are good. An ordinary microscopic slide which has been chosen for the cleanliness and the smoothness of its edge will give perfectly satisfactory results. The result to aim at is the firm spreading at even pressure and uniform rate of a wide and continuous film to roughly cover two-thirds of the length and half the breadth of the glass slide with a smear of such a suitable thickness that a single layer of separated corpuscles is spread out.

The termination should not "tail," but should end in a regular line or curve (2, Plate I). The operation should be commenced as soon as possible after the blood drop has been placed on the slide. To give the slide the necessary support it should invariably rest on some firm basis.

Many of the mistakes in the preparation of blood films can be recognized at a glance. In some the blood has not been allowed to completely spread over its base before the film is made, whilst perhaps the film has been started slowly and finished quickly (3, Plate I). In others too small a blood drop has been taken, or too large a drop, whilst the spreader may have been applied with unequal pressure. Jerky spreading, due perhaps to anxiety to produce a good smear or to insufficient support to the slide, will result in a broken film (6). A greasy slide will cause the red corpuscles to form rouleaux, and a broken ragged film will result (7), whilst a good smear may be subsequently spoilt by flies feeding thereon (8).

When spread, films should be dried by waving the slide, held edgewise, backward and forward in the air. The films should then at once be folded in clean paper and sent in for examination.

Fixing the Film.

The next and most important step is to thoroughly fix the film. Either ethyl or methyl alcohol must be used; the latter is quicker but dearer. It may be conveniently purchased in B.W. and Co.'s glass capsules. Whichever form of alcohol be chosen, it must be without doubt absolute in quality. The least trace of water is harmful, and for this reason the greatest care must be taken to protect the fluid in stock. All bottles containing absolute alcohol should be thoroughly well stoppered. Fixation is best carried out in a bottle. Half-an-hour may at times be a convenient period, twenty-four hours is not too long. If there be any reason for urgent hurry ten minutes will suffice. The fixing bottle should be frequently refilled with fresh absolute alcohol. After fixing the film should be air dried as before, and once again protected from dust and insects if staining is not to be immediately proceeded with. The objection to drying with blotting-paper is that foreign matter is liable to be deposited on the smear.

Staining the Film.

Stain with Löffler's blue and some by Gram's method. Examine with the oil-immersion lens. Make a careful search over the films, looking on large cigarette-shaped bacilli, noting whether they are or not arranged in chains. Examine the Gram specimens and see whether the bacilli are to be seen in them also.

A specimen of anthrax bacilli is appended in Plate II. The lower portion of the field shows bamboo-like chains and spores, and is taken from cultures. Methylene blue, $\times 1,000$. The portion showing spores is stained with carbol fuchsin, decolorized by brief immersion in methylated spirit, and counterstained in methylene blue.

Post-mortem.

The *post-mortem*, however, always clears up the diagnosis; but, as a rule, elephants dead of anthrax must not be opened on any account. Plug all natural openings with disinfectants. If plenty of wood is available, burn the carcase whole, or bury in lime. The remainder of the burnt carcase should be thoroughly sprinkled with chlorinated lime and then buried properly. The top of the grave should be covered with a cart-load of ordinary lime. Great care should be taken to remove the tusks. The men employed to do this must not have any sores, abrasions, or scratches. Their hands should be properly rubbed with carbolic oil (1 in 20), and if by accident they cut their hands when extracting the tusk, it should be cleansed with a strong carbolic lotion (1 in 40) and dressed antiseptically. The men should be forbidden to continue work.

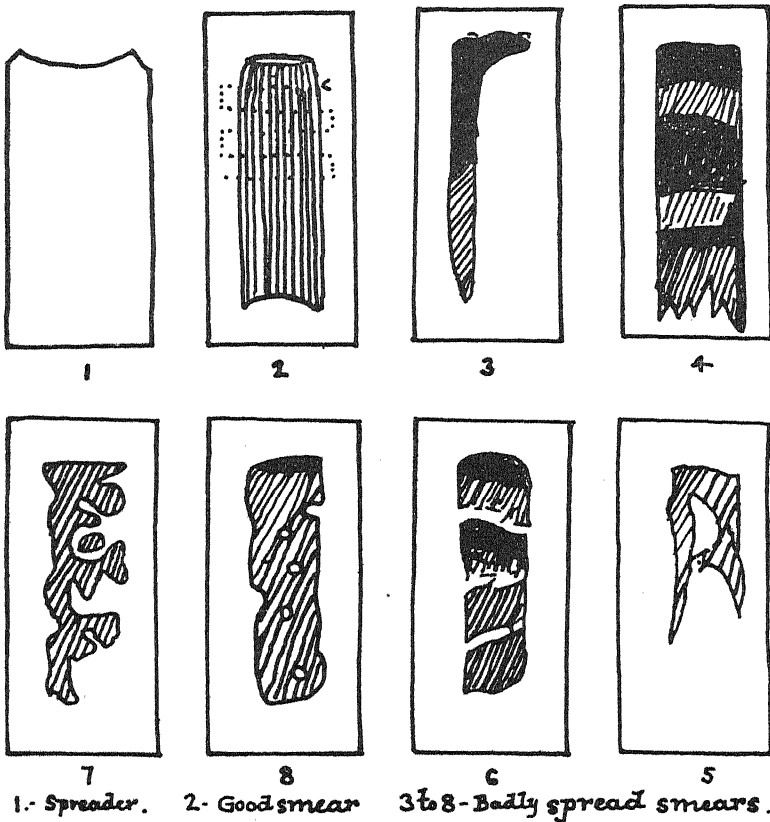
After the operation the men engaged should have a thorough phenyl bath, and all clothes worn by them during the time of operation must be burnt. All instruments, including dah, axe, knives and other things, must be put into flames and then washed in strong carbolic lotion. Any instruments once used in *post-mortem* examination should not be used in opening abscesses or other surgical operations. Care must be taken to restrict the infected area to the smallest limits. A deep pit should be dug alongside and the carcase tumbled in. Liberal quantity of lime should be sprinkled in the soiled area and a big fire made in this area. After this the area should be strongly fenced in.

Briefly, one finds on opening the abdomen a large quantity of free straw-coloured fluid, with sometimes flakes of lymph all over the coil of intestine. There is a peculiar jelly-like œdema of the mesentery, and the mesenteric glands are large, swollen, and hæmorrhagic. The peritoneum covering the bowel is congested and may show petechiæ, but the typical lesion appears to be numerous submucous hæmorrhages into the wall of the bowel,

which may be very extensive and destroy the mucous membrane, and are easily seen by holding up the bowel to the light, when they appear like black patches through the empty intestine.

The spleen is congested, dark, swollen, and soft, and may be diffuent. It swarms with bacilli. The heart-blood is thick and tarry, and the lungs and pleuræ are congested and may show petechial hæmorrhages.

PLATE I.



TREATMENT.

I generally adopt the following plan of treatment:—

In the Internal Cases.—Hypodermic injections of strong carbolic acid 2 minims per dose mixed with equal part of glycerine are recommended every four hours. If the animal is in a collapsed state hypodermic injections of 2 gr. strychnine tabloids

should follow the carbolic acid injections an hour after the first carbolic acid injection. These two injections should be given alternately until the grave symptoms disappear.

The suitable site for hypodermic injections which I generally prefer in the elephant's body is either the part close to the shoulder-joint or the haunch bone.

A fold of skin should be taken up with the finger and thumb of the left hand; the needle should then be passed through the skin obliquely under the surface. The syringe containing the injection should then be attached to the needle and the fluid injected slowly. If the injections cannot be carried on successfully 1 drachm of strong carbolic acid may be tried internally on tamarind every four hours, and 1 oz. dose of liquor arsenicalis may be given on tamarind every four hours, to begin an hour after a dose of carbolic acid.

N.B.—Syringes and needles should be boiled before and after use, and only water that has been filtered and boiled should be used for dissolving tablets.

External Cases—For malignant pustule, excision and actual cautery have their advocates, but the former is liable to be followed by a general infection, and the latter is difficult to carry out on elephants.

Sclavo's serum with or without excision may be recommended.

Another treatment recommended which has the advantage of being simple is cauterization with the solid caustic potash. I have tried this in many cases with very good results. It certainly seems worthy of trial, and is without the disadvantages of the treatment described above.

I generally follow the undernoted plan:—

In mild cases without fever, or cases seen after the fever has subsided and obviously clearing up, almost any treatment suffices, touching with pure carbolic and antiseptic precautions, or a crucial incision with the application of pure carbolic in the moderately severe cases.

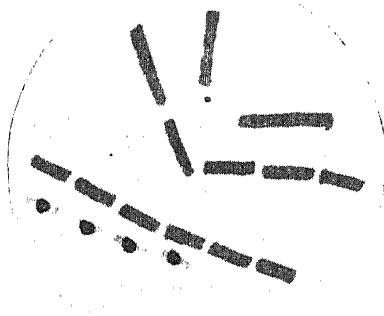
In bad cases with high fever and much inflammatory oedema the following method gave excellent results, and no time should be lost in carrying it out. All around underneath the pustule 50 per cent. carbolic acid is injected with a hypodermic needle at close intervals. The idea of the treatment being that the pustule is shut off from the circulation by a zone of carbolized

slough, which seems to effectually prevent the infection becoming generalized.

MANAGEMENT OF THE OUTBREAK.

First and foremost is the *prophylaxis*, and it is obvious that the epidemic must be dealt with vigorously, when the cases will cease automatically, except perhaps for an occasional sporadic case. Any elephant dying suddenly without any apparent cause, whether "swelling" or "no swelling" on its body, must be taken as a suspicious case and its blood slide should be taken at once. If a little care is exercised in following up the method described above as regards taking the blood slides, no difficulty will be felt in examining the slides and coming to a correct

PLATE II.



Anthrax Bacilli.

diagnosis. Segregation should at once be carried out as far as practicable and particular care be taken to remove the elephants up stream from the infected camp, as spores are carried in water. The infected animal should be examined twice a day, and if any elephants develop any signs or symptoms of anthrax the camp should be changed at once to a place situated up stream, leaving the sick elephant on the spot. When examining infected elephants note whether eating usual fodder, any swelling on its body, body heat (temperature), and the particular look on the eyes of the elephants. If the following symptoms are absent from the beast on inspection it indicates illness.

The prominent signs of health are constant motion of trunk, swinging of the tail; mucous membrane of the mouth, vagina,

ears and eyes are bright pink colour. The appetite is good; the animal sleeps but few hours at night, and immediately on waking commences to eat. As the anthrax spores lie dormant for years, proper inquiry should be made before locating a camp whether there was any epidemic amongst the cattle in the villages close to the grazing ground even years back (to be on the safe side four or five years).

Each elephant should be separated at least half a mile, and an attendant must be always with it to prevent the beast straying from a prescribed area. If there is no outbreak, within seven days the elephants may be removed to a non-infected area across a large stream.

All gear should be burnt, and iron fetters, &c., should be passed through the flame and kept unused for some time until the epidemic is completely over.

The tusks after being extracted should be properly soaked in strong disinfectants and put aside separately for at least a month. They should then be dried and chlorinated lime should be sprinkled on them.

REFERENCES.

- [1] "Elephants and their Diseases," by Lieutenant-Colonel G. H. Evans.
- [2] *Indian Medical Gazette*, April and September, 1915 numbers.

INTERVIEWED with respect to the continued high prices of meat in France, the Minister of the Interior (M. Maloy) said he was convinced that the arrival of foreign meat in appreciable quantities and in regular manner would bring about a fall in prices, but if in consequence of the attempts of speculators this result was not attained, the Government was very frankly determined to have recourse to the fixing of prices, as it had power to do by the law of 1791.

Abstracts.

THE CAUSE, PREVENTION AND TREATMENT OF RETAINED PLACENTA IN THE COW.

By W. L. WILLIAMS.

Department of Surgery and Obstetrics, New York Veterinary College.

WHEN the cow has conceived, the segmented ovum has descended into the uterus and the embryo has formed, there are promptly thrown out the foetal envelopes, through the medium of which the embryo is to receive its nutrition, to be protected from exterior influences and to be maintained in its position.

The embryonic sac develops very rapidly, out of all proportion to the size of the foetus, and quickly extends from the internal os uteri to the apices of the horns. Not only is the embryonic sac co-equal in dimensions with the uterine cavity, but it becomes excessively long, and the tip of each cornu becomes necrotic. In some cases apparently the tip of the embryonic sac presenting at the internal os uteri also becomes necrotic.

The embryonic sac, developing co-equal with the size of the uterine cavity and firmly distended with the foetal fluids, tends thereby to become securely fixed in its position.

Prior to the first conception, there exist in the mucosa of the uterus numerous slight elevations which are recognizable as the future maternal placentæ or cotyledons. When the animal is in estrum, these elevations become more prominent, are enlarged, and at the close of estrum there occurs from their surface a well marked hæmorrhage—menstruation.

When the embryo has attained a length of $\frac{1}{16}$ to $\frac{1}{8}$ in. the cervical canal becomes sealed by a gelatinoid mass, which we designate the uterine seal, and the uterine cavity becomes a sealed sac. When the embryo is but $\frac{1}{4}$ in. in length, or less, there appear upon the exterior of the chorion distinct vascular areas, which are more or less thickened, and which correspond to the primitive cotyledons or placentæ in the uterine mucosa. These foetal cotyledons or placentæ lie in intimate contact with those of the uterus, and correspond accurately with their location and area.

If a cow aborts before the end of the fourth, and largely during the fifth month, there is no retained placenta. Very largely in early abortions the entire foetal sac is expelled still surrounding the foetus. As a result it is a common observation of breeders that abortion at this period is not as serious as when occurring later. The uterus promptly cleans up, and the animal as a general rule again conceives readily and carries the foetus with reasonable security.

As pregnancy advances the intimacy of contact between the uterus and chorion continues to increase up to the day of parturition. If the uterus of a healthy cow in the last stage of pregnancy is opened immediately after slaughter the contact between the uterus and chorion is found to be very intimate, and a considerable degree of force is required to separate the two structures. They do, however, separate completely (see fig. 1).

The force which maintains the contact between the chorion and the uterus is unknown.

As we have already stated, the foetal sac completely fills the uterine cavity, so that the close contact between the uterus and chorion is maintained mechanically by the internal pressure of the foetus and its fluids. From without, the abdominal walls and viscera maintain an exterior pressure, so that the contact between the parts is further assured. This mechanical pressure, however, is not all.

There develop in the cotyledons of the uterus deep and intricately branched cavities or crypts opening towards the foetal sac. Upon the surface of the corresponding vascular area of the chorion, the foetal placentæ or cotyledons, there grow out numerous chorionic tufts (see fig. 2) consisting essentially of profusely branched capillaries with thin walls. These extend deeply into the crypts of the uterine cotyledons, and bring about the intimacy of contact necessary for the exchange of nutritive and waste substances and add to the security of the foetal sac in the uterus. There is, however, at no time any continuity of tissue between the foetus and the mother. The extremely thin walls of the maternal and foetal capillaries come in immediate contact. They do not fuse, however, or in the ordinary sense adhere to each other, but remain throughout the life of the foetus wholly separate.

Through the walls of these capillaries, lying in intimate con-

tact, the nutritive substances pass to and fro between the mother and the foetus. No solid substance recognizable by vision has yet been known to pass through from the one set of capillaries to the other. Red blood cells do not pass and, so far as known, so long as the capillary walls remain intact no organisms visible under the microscope pass.

The force which maintains the contact between the foetus and the uterus seems to be purely one of mutual attraction. So long as the foetus lives and the navel cord remains intact, there appears to be a powerful attraction between the placenta which we cannot define. When the life of the foetus ceases, when the foetal heart ceases to beat, or when the navel cord is ruptured, the attraction existing between the uterus and the foetus ceases abruptly. The life of the foetal membranes depends entirely upon the physiologic operation of the foetal heart. The instant the navel cord ruptures or the foetal heart ceases to beat, the placenta ceases to exist as a living tissue. The rupture of the navel cord causes an immediate emptying of the chorionic capillaries of blood, so that not only has the attraction between the two tissues suddenly ceased, but the volume of the foetal capillaries has become enormously decreased.

It has been stated that the separation of the chorion is brought about by the contraction of the uterus. Histologists, however, tell us that there is no power in the tissues of the uterine placenta to expel the tufts of the chorion. There are no muscle fibres in these parts, nor is there any elastic tissue of moment, so that they cannot in themselves contract and expel the chorionic tufts. It is not the mechanical compression of the uterine walls upon the chorion which detaches it. It is perfectly true that the uterus contracts promptly, and equally true that the contraction of the uterus expels the detached chorion from the uterine cavity, but it does not detach the placenta. We must accordingly keep separated in our minds the dehiscence of the placenta and the expulsion of the foetal membranes from the uterine cavity. We occasionally observe dehiscence or separation of the placenta without their expulsion.

The Nature of Retained Placenta.—When the normal detachment of the foetal membranes is interrupted, we designate the phenomenon as “retained placenta.” The exact nature of retained placenta has not been as well studied as it deserves. In extensive investigations upon the killing floors of abattoirs, in

which 1,700 pregnant females were examined, diseases of the placenta other than septic inflammation were exceedingly rare. We observed in one case an intra-placental hæmorrhage, which would rather tend to detach than to detain the foetal membranes. In another case we found a very extensive calcification of the cotyledons, which, had the cow been allowed to go her full term, would probably have caused serious retention of the foetal membranes. We examined also an equal number of cows and heifers which were not pregnant, and in a number of these retained placenta existed. Except in the one case which we have related, the only cause of retained placenta observed was metritis, or rather cotyledonitis. Infection having entered the uterus, the cotyledons had become inflamed, swollen, and greatly enlarged. The swelling caused by the inflammation compressed and incarcerated the tufts of the chorion. There was constantly no inflammatory adhesion between the chorion and the uterus, but an incarceration due to swelling of the cotyledons.

We habitually hear it said that retained placenta in the cow is liable to be followed by metritis. This is a gross misconception of the facts. In all cases retained placenta is preceded by metritis. In other words, we should regard retained placenta not as a separate affection, but as a complication of metritis. The metritis must originate some time prior to the expulsion of the foetus and have had time to develop, prior to calving or abortion, a sufficiently intense inflammation of the uterine cotyledons to incarcerate the tufts of the chorion. It has been erroneously assumed by writers that improper care of the cow after parturition, permitting her to take cold, or allowing her an improper diet, induces retained placenta. We commonly hear it said that general debility of the animal or prolonged labour causes retained placenta. In the very nature of the case this cannot be. The metritis which leads to the retained placenta may indeed cause great debility or critical illness of the animal, and equally it may cause difficult labour, because the metritis stops the normal contraction of the uterus. That the metritis may develop and increase in seriousness subsequent to abortion or parturition because of the retained membranes is perfectly logical, and this increased severity of the disease is too often mistaken for the beginning of it.

Retained placenta is the result of an infection which has entered the uterus. If we study retained placenta carefully we

find that clinically the retention originates about the internal os uteri and extends amongst the cotyledons toward the apices of the horns, chiefly in the gravid horn. A careful clinical study of a case of retained placenta usually shows that the cotyledons nearest the internal os uteri have become necrotic and sloughed off, or they have suppurated and the chorionic tufts have been forced out, or the chorion has otherwise become detached. Reaching forward toward the apex of the horn, it is found that the first cotyledons encountered are somewhat readily separated from the chorion because there has been a suppuration in the crypts of the cotyledons which has forced out to a great extent the tufts, or we find that the cotyledons have become necrotic and drop off in the hand upon slight tension. Passing yet further toward the apex of the uterus, we find the cotyledons enormously enlarged and hard. They are not necrotic, and the chorion is difficult or impossible of detachment from the cotyledon. This suggests to us that the infection has entered the uterine cavity through the cervical canal and has slowly spread forward toward the apex of the cornu.

We have stated above that when conception has taken place and the embryo has reached a length of $\frac{1}{8}$ in. to $\frac{1}{4}$ in. the cervical canal becomes sealed and invasion of the utero-chorionic space apparently completely barred. It must therefore be that in some way the uterine seal has been overcome or the infection has occurred in spite of it. In our examination of 1,700 pregnant uteri we failed to find metritis in any case where the uterine seal was intact. Among the cases with sealed uteri was found an extensive infection of contagious abortion in numerous cases. The exudate, always massed about the internal os uteri, was frequently thickly distributed over the entire space between the uterus and the chorion. Yet, so long as the seal remained intact, metritis was absent.

The question consequently arises, "When and how does the infection which causes retained placenta invade the uterus and establish metritis?" In all our investigations upon pregnant animals we have not yet observed a case where any solution or disturbance of the uterine seal appeared to occur as a result of infection from the vaginal end. We have observed severe vaginitis with extensive collections of pus in the vagina, the bulk of it lying against the vaginal end of the uterine seal. Yet the

uterine seal seemed resistant and to constitute a thoroughly efficient barrier against bacterial invasion.

On the other hand, in some cases of pregnant uteri containing the abortion exudate there were distinct evidences of solution of the uterine seal beginning at the anterior end. This would at least suggest to us that the uterine seal, when dissolved, is usually if not always accomplished by the action of bacteria which have been enclosed within the uterine cavity of bacteria when the uterus was sealed, or in some as yet unexplained manner has later invaded the sealed cavity.

We have elsewhere proposed the hypothesis and presented certain arguments to show that infection may enter the uterus prior to conception, but so long as the uterus remains sealed metritis does not occur. In some cases where the abortion exudate was present in the uterus early in pregnancy the uterine seal was absent and conditions suggested that in embryonic or early abortion the presence of the infection prevents the sealing of the uterus at all. It would consequently appear that in all probability retained placenta is due to an infection which has long existed within the utero-chorionic space and ultimately dissolves the uterine seal. A secondary invader may then enter the uterine cavity and induce metritis, or it may be that the organism already existing within the utero-chorionic space, once the seal has been destroyed, takes on a new character, in the presence of oxygen, to cause the metritis.

So far as we know, there is but one organism which may exist indefinitely in the sealed uterine cavity of the cow—the abortion organism of Bang.

It has long been recognized that there is an intimate relationship between contagious abortion and retained placenta. It is well known that abortion is very largely accompanied by retained placenta. In our Ambulatory Clinic for 1912-13, we attended thirty cases of retained placenta, including 27 cows, 2 mares, and 1 ewe. Of these definite record was made of abortion in the 2 mares, the 1 ewe and in 7, or 25 per cent., of the 27 cows. Others probably followed abortion and no record was made. How many of the remainder accompanied premature births due to the infection of contagious abortion or how many of those calving at full term had abortion exudate in the utero-chorionic space was not determined.

If the abortion occurs prior to the fourth or fifth month the foetus is generally expelled enclosed in its membranes, or the membranes follow very promptly, and retention does not occur. Whenever abortion occurs later during pregnancy retention of the membranes is a very common occurrence. The probability

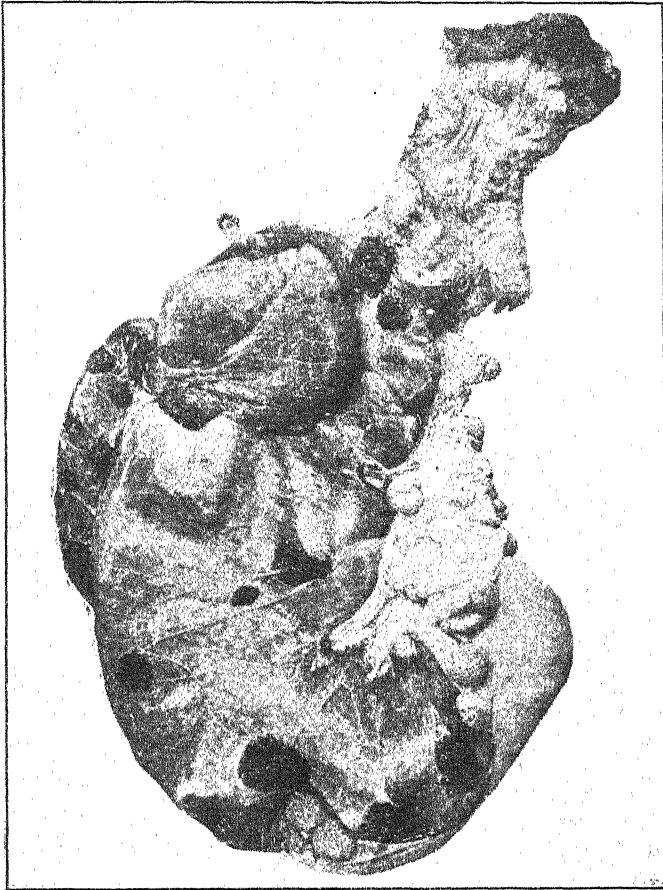


FIG. 1.

Uterus of cow in advanced pregnancy, opened longitudinally, showing foetus (through chorion) in situ, some cotyledons detached.

of retention increases as the period of pregnancy advances. Retained placenta is more frequent in cases of premature birth than in those of abortion, because the premature births come at a later epoch in pregnancy with more elaborate chorionic tufts.

In obstetric work we not infrequently meet with cases at full term where large volumes of abortion exudate are expelled prior to or during the expulsion of the fetus. In such cases retained placenta is highly probable.

In our clinic we have made some effort to test the connection between retained placenta and abortion through the medium of the agglutination test applied to the blood of the affected cows.

An important element of uncertainty enters into the question of the relationship between abortion infection and retained placenta by the fact that, so far as we know, the abortion infection can only lead to retained placenta when it exists in large amount in the utero-chorionic space. It has been shown that the bacilli live in the udder, and we believe also that they live and multiply in the vagina and alimentary canal. No reason is known why the bacilli growing in these or other organs may not as readily cause the blood to agglutinate as do those growing in the uterus.

If we approach the question from another angle, we get some further light upon the cause, although still not conclusive. So far as the recorded investigations go, each and every cow having retained placenta which has been killed within a few hours after abortion or calving has uniformly shown in the utero-chorionic space an abundance of the abortion exudate containing the bacillus of Bang.

The number, however, is pitifully small. It is not safe, in the present state of our knowledge, to say that retained placenta is always the result of the infection of contagious abortion in the utero-chorionic space. Certainly an overwhelming majority of cases are referable to this cause, and it has not been clearly proven that any case of retained placenta in the cow has ever occurred in the absence of the infection of contagious abortion. If we could eliminate the infection of contagious abortion from the uterine cavities of pregnant cows we have every reason to assume that retained placenta would become as rare in cows as it is in other domestic animals.

The symptoms of retained placenta in the cow are usually so prominent that they need no description. In some cases the symptoms are exceedingly vague. Sometimes the retained placenta is either fragmentary or complete without any portion of the membranes showing externally. In one case, for example, we

observed, following abortion, the entire mass of foetal membranes enclosed within the uterus. The cotyledons had all sloughed away from the uterus and remained attached to the foetal membranes. There were no exterior evidences of the retention except the general appearance of ill-health and the discharge from the vulva. Fragmentary retention of the placenta toward the apex of the horn is quite common, and although the metritis which has caused the retention is fully recognized, fragments of the membranes frequently go unrecognized even until the death of

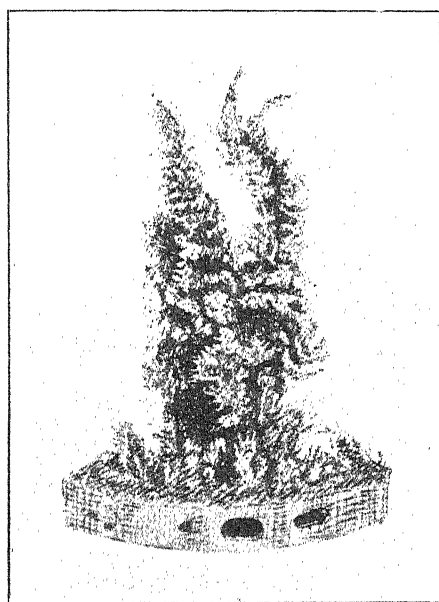


FIG. 2.

Chorionic tufts. (After Pomayer.)

the animal, and are revealed only upon *post-mortem* examination. They are so far removed from the cervical canal that they cannot be reached by the operator's hand, or perhaps they go unsuspected and are not searched for. Hence, in such cases, the symptoms are merely those of metritis, and the recognition of the retained placenta is possible only by careful manual exploration.

The handling of retained placenta is one of the most complex problems facing the veterinarian. It is a many-sided question.

The retention of the placenta intensifies the metritis which has caused it. The disease may have a fatal termination. It may cause a chronic metritis with pyometra, which interferes with the milk flow, and the pus constantly escaping from the vulva to some degree eventually finds its way into the milk, contaminating it and rendering it more or less dangerous for human use. A very large percentage of animals which suffer from retained placenta are afterward sterile and become a complete loss for breeding and dairying purposes.

In our "Veterinary Obstetrics" we have suggested three plans of handling:—

(1) The manual removal of the foetal membranes. This should always be done whenever the chorionic tufts can be withdrawn from the crypts in the cotyledon. That is, whenever the foetal membranes can be completely detached from the uterus this should be done. If, however, it is attempted to detach the membranes, and instead of the chorionic tufts pulling out from the crypts, the foetal cotyledon tears away from the surrounding portions of the chorion and remains attached to the uterine cotyledon, nothing has been gained. Indeed, much has been lost. There is no longer that weight of the membranes dragging upon the now isolated membrane, which would tend gradually to detach the tufts.

If in using force to detach the foetal from the maternal placenta the maternal cotyledon is torn or its neck is ruptured little good can come from the process. Rather, it is decidedly dangerous.

One of the great difficulties in the manual removal of the placenta is that, owing to the paralysed condition of the uterus, it has not undergone involution, and the most firmly retained cotyledons at the apex of the gravid horn cannot be reached by the operator. Were it not for the metritis which has caused the retained placenta the uterus within five or six hours after parturition would be reduced to such size that the operator could readily reach the apex of the horn, but it is not in these cases that the retention occurs.

When the manual removal of the afterbirth has succeeded the uterus should be well doused with a mild antiseptic and the fluid carefully drawn off. After this has been done, it is a good practice to deposit in the uterine cavity about $\frac{1}{2}$ oz. of powdered iodoform enclosed in a gelatine capsule. This dissolves slowly, does

not irritate the uterus, and remains in the uterine cavity from four to six days, largely preventing decomposition and the extension of the infecting process.

(2) The expectant treatment, by which time is given for the spontaneous detachment of the membranes. The membranes may become detached in a variety of ways. As in all other inflammations, so in the inflammation of the uterine cotyledon, the disease process may abate, the swelling disappear, and as a result the incarceration of the tufts of the chorion cease, so that the membranes fall away spontaneously. Again, the crypts in the maternal placenta may undergo suppuration or a serous effusion may occur which may force the chorionic tufts out of the crypts. The cotyledons may become necrotic and slough off with the chorionic tufts still imprisoned. During this waiting period it has been proposed that the uterus be flushed out with anti-septic liquids. This is not very efficient. The disinfecting solution does not go into the uterine cavity, but into the foetal cavity of the membranes, and does not come in contact with the uterus at all, except at those points where the membranes have become detached. Elsewhere the chorion lies in close contact with the uterine wall, attached here and there by the cotyledons acting as so many pillars crossing the utero-chorionic space from uterus to chorion. Between these two sacs it is not practicable to introduce a disinfectant, though possibly more might be done than has yet been attempted, especially if a soft rubber tube were carried along against the roof of the uterus above the roof of the chorion and gently insinuated between the two walls as far as practicable.

While this plan of douching the uterus with disinfectants is highly recommended by some, it is as thoroughly condemned by others. In a measure each position is correct. One of the great objections to introducing large volumes of fluid into the uterine cavity or into the cavity of the foetal membranes which are lying within the uterus is that the paralysed uterus is not competent to expel the fluids introduced. If they are retained, their disinfecting value quickly ceases, and the fluids encourage rather than discourage the extension of the infection. The weight, too, of the fluids remaining in the uterus interferes very seriously with the process of repair, and is consequently highly objectionable. Again, if we attempt to force fluid into the uterus when the cervical canal is quite narrowed, and if the tube almost or

completely fills the canal, the uterus may be actually ruptured, especially when the fluid is forced in with a pump.

It is difficult to remove the fluid when the uterus is paralysed. It will not syphon out with an ordinary tube because the membranes immediately occlude the opening. The cervix of the uterus is usually not involved, but contracts promptly, while the walls of the uterus itself, being inflamed, are paretic, so that they cannot contract properly, and hence the fluid is imprisoned. If we inject fluid, we must accordingly remove it if it is not promptly expelled. If the uterus still has sufficient contractile power to expel the fluid, this washes away much of the decomposing matter. If the veterinarian can remove the fluid by any means he will usually get good results from the douching. With some form of douching tube one may in many cases drain the fluid off fairly well. This may be aided by manual pressure per rectum. After the removal of the injected fluid we find that the introduction of $\frac{1}{2}$ oz. of powdered iodoform in a gelatine capsule renders important service in preventing decomposition and checking the sepsis. Daily examination should be made, and as soon as practicable the membranes should be manually detached and removed.

(3) The manual removal of the placenta along with the uterine cotyledons. This plan has only a limited application. When the cotyledons have already sloughed away from the uterus and lie free within the uterine cavity or still attached to the foetal membranes, removal is evidently the only logical course to pursue. In a few cases the cotyledons may be recognized by touch as being necrotic, enormously enlarged and hardened and very readily detached by slight tension, without being followed by any hæmorrhage. In such case the operator should not hesitate to remove the cotyledons entirely.

When all the cotyledons have sloughed away or been detached they do not reform, but in their stead in the next pregnancy the placenta takes the diffuse form like that of the mare. In old cows this diffuse form of placenta is quite common around the internal os uteri, indicating that during some previous pregnancy infection had been present in this region, which caused necrosis of the cotyledons. In a few cases examined by us upon the killing floor the placenta was diffuse throughout the entire extent of the uterus, indicating that as a result of serious infection at some previous time all the cotyledons of the uterus had been destroyed.

After the foetal membranes have been removed or expelled under any method of handling, the veterinarian should see that the case is followed closely until the basic metritis in the uterus is overcome. It is not good practice to remove the placenta from a cow and not see her again and have no report regarding her condition. Whenever an animal is valuable, as in pedigreed stock, it is essential that the veterinarian should make frequent visits until the metritis is under complete control and no danger remains that the case will degenerate into one of chronic metritis or pyometra.

At best, the handling of retained placenta is merely an amelioration. The prognosis is by no means as good as many people believe. The case requires very close attention, and the results, especially in relation to breeding, are frequently very disappointing.

The prevention of retained placenta is a problem of far greater importance, which has not as yet been seriously attacked. From what we have stated above, it naturally follows that if we would prevent the metritis which causes retained placenta we must first of all prevent the infection of contagious abortion in the utero-chorionic space. It seems to us quite certain that if this infection could be eliminated there would be no more complaint of retained placenta in the cow than in other domestic animals.

If we accept the hypothesis which has been proposed by us, that the infection of contagious abortion enters the uterine cavity by the cervical canal prior to the sealing off the uterus, then the prevention of retained placenta must antedate conception. If we accept the more common hypothesis, that the infection of contagious abortion may enter the utero-chorionic space through a variety of avenues and at any epoch during pregnancy, the prevention of the metritis which causes retained placenta, in so far as it may be due to the infection of contagious abortion, must again be based upon some efficient method for controlling the abortion infection. In order to be efficient the precautions must again begin prior to conception, but it becomes more essential to continue the battle during pregnancy. We have not yet found an entirely efficient method.

We find that when we are able to induce a breeder to enter upon a comprehensive plan of permanent disinfection and hygiene of the genital organs of breeding animals the volume of retained

placenta becomes markedly decreased. That is, when we apply conscientiously an efficient method of sexual hygiene we ameliorate in a marked degree that great group of phenomena due to the infection of contagious abortion. Any measure that we will take to prevent the metritis which causes retained placenta will likewise decrease, according to our observations, the percentage of abortion, of premature birth, and of sterility.—*Report of New York State Veterinary College, 1913-1914.*

TUBERCULOSIS IN PHEASANTS.

By E. M. PICKENS.

Department of Comparative Pathology, Bacteriology and Meat Inspection.

OWING to the relatively small number of domesticated pheasants the public in general is not very familiar with the diseases of this species. A careful study of the literature on the subject shows that tuberculosis is a common disease, especially where these birds are kept in large numbers. Very few references are found of cases of tuberculosis in the wild pheasant. This is partly due to the fact that a comparatively small number of them are killed, and also that the chances of infection are not nearly as great as in the case of the caged birds. This condition is due to the fact that the wild bird is not as much exposed to infection from droppings, feeding dishes, runs, &c.

In Germany, Bierbaum [2] describes an outbreak of this disease where, out of forty pheasants, five died within fourteen days after purchase. He gave a very brief description of the lesions found in two hens. His diagnosis was made by finding the presence of the organism on microscopical examination.

In Italy, Baldi [1] described the lesions in several birds brought to the Veterinary Clinic of Perugia. The birds came from a large property, where the mortality had been quite extensive. On *post-mortem* examination the liver was generally found much enlarged, with nodules of various dimensions, some of which contained caseous material. Microscopical examination of these nodules revealed the presence of numerous bacilli of avian tuberculosis.

In New Zealand, Drew [6] reported the presence of the disease in that country. He described the lesions found in several birds.

Sibley [12] and also Van Es and Schalk [13] state that the disease occurs in pheasants in America.

Fagundes [7], Freidberger and Fröhner [8] and Law [9] all make the statement that the disease occurs in pheasants, but do not cite specific cases. Law gives a brief description of the lesions found.

Salmon [11] also makes the statement that the disease occurs in pheasants. He quotes Nocard to the effect that this disease may be diagnosed in the living birds by means of the subcutaneous tuberculin test. He gives the dose of tuberculin of from 5 to 10 cg.

Morse [10] writes that tuberculosis is fairly common among domesticated pheasants and is often spoken of as "going light." He continues to say that all cases of "going light" are not

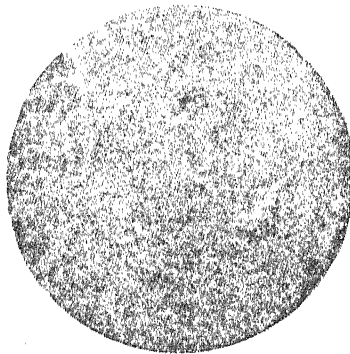


FIG. 1.—Small tubercle in liver of pheasant showing arrangement of giant and epithelioid cells. $\times 50$.

tuberculosis. He gives a brief description of the *post-mortem* findings.

Cadiot, Gilbert and Roger [3 and 4] have done considerable work on this disease. They have infected pheasants with the avian tuberculosis organism and allowed them to die; proving that the avian organism will cause the disease in pheasants.

Cadiot [5] describes several epizootics of the disease among pheasants. He gives a careful description of the lesions found, and a comparison of the lesion of the pheasant and the fowl. He says that the tubercular lesions in the two species are practically indistinguishable to the naked eye. A histological examination, however, shows several differences. Some of the most important are: In the pheasant the tubercle bacillus causes a development of epithelioid cells; these soon undergo molecular degeneration, and are succeeded by the formation of an abundance of connec-

tive tissue, which surrounds pseudo-vascular cavities, and undergoes hyaline necrobiosis, which, though at first limited to the

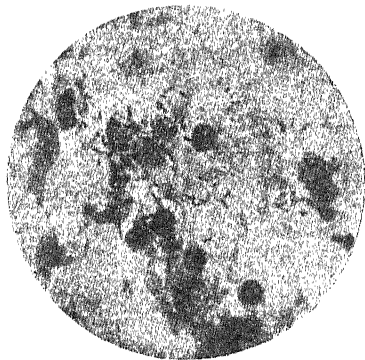


FIG. 2.—*Bacterium tuberculosis* in smear from spleen of pheasant. x 750.

centre of the tubercle, and producing the appearance of a clear centre surrounded by special epithelioid cells, afterwards extends to the whole of the new growth and tends to encystment.

HISTORY OF AN OUTBREAK IN NEW YORK STATE.

A male pheasant was received at the laboratory for examination in the early part of May, 1914. At this time the weather was particularly warm, and the senders had neglected to pack the specimen in ice, so on its arrival it was decomposed to such an extent that an examination was impossible. The senders were requested to ship us another affected bird properly packed, and also to give us a history of the trouble.

A short time afterward a second bird was received, together with a somewhat complete history of the outbreak. This was as follows: "For the past three years there had been a noticeable affection among the pheasants. The symptoms showed themselves in various ways, chiefly by loss of appetite and continued inactivity. Between 10 and 20 per cent. died each year. Most of the deaths occurred in the spring or early summer, the hens being more susceptible than the cocks. Death was preceded by loss of appetite, drooping of the wings, paleness about the head, and a listless and inactive appearance. These symptoms were noticed for about a month before the bird succumbed. About

two or three days prior to death the bird refused all food and showed little, if any, activity.

"The pheasants were housed in open wire cages, placed at the end of a field, and in the vicinity of a spruce hedge. The cages were oblong in shape and large enough to permit of some flying. The air drainage was good and the location was high enough to be free from any excessive dampness in the soil. Every spring, and once during the season, the cages were thoroughly limed and disinfected. Grass was sown each season, and the birds got a sufficient supply of green food. Water was supplied once a day, and the birds were fed a ration made up of peas, wheat, cracked corn, oats, and a little millet. It was noticed that the corn was consumed first, after which the ration was made to contain about one-third cracked corn. This season the cages were removed to fresh ground."

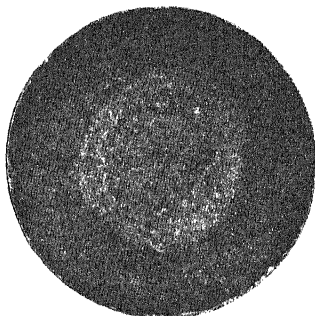


FIG. 3.—Small tubercle in liver of fowl showing arrangement of giant and epithelioid cells. x 50.

The case in hand was a female bird of average size, probably 2 years old. She was emaciated to such an extent that the pectoral muscles could scarcely be felt. The feathers were much ruffled and showed a general unthrifty condition. Upon *post-mortem* the following conditions were found:—

Liver.—The liver was about natural size, and was thickly studded with yellowish-white, irregularly round areas. These areas varied in size from being scarcely perceptible to the naked eye to about 1 cm. in diameter. All surfaces of the organ were affected alike. In the intervening spaces between these areas where the liver tissue could be seen, it was pale and seemed to have undergone parenchymatous degeneration.

Upon section the above mentioned irregular, light-coloured areas were found to extend below the surface of the organ, and were distributed more or less uniformly throughout. Upon close examination these areas showed what seemed to be caseation necrosis. The smaller areas were of a greyish-white colour, while the larger ones were somewhat darker. They were a dirty yellowish white, and appeared to be homogeneous, having a more or less hyaline appearance and a caseous consistency.

Spleen.—The spleen was about twice its normal size, and was so thickly studded with these yellowish white areas, that it was practically impossible to see any normal tissue. In certain places minute, light-coloured areas could be distinguished standing out against the darker splenic tissue, but almost universally these areas had grown to such a size that they had become confluent with their neighbours, and the whole organ gave the appearance of being a single, large yellowish-white nodule. Upon section, the organ showed the same condition as the liver, except that there was very little normal tissue to be seen. The interior of the organ appeared to be composed of the same caseous material, and was of the same consistency. No calcification was found. In the other organs of the body no marked lesions were found. The intestines, kidneys and ovaries, as far as could be determined, were practically normal.

Numerous smears were made from diseased areas of both the liver and spleen. These were stained for tubercle bacteria. Upon examination of these smears the characteristic acid-fast organisms were found in large numbers. They were long slender rods, resembling very closely, if not identical with, the avian tuberculosis organism.

After the smears were made the spleen was cut up into very small pieces and used for making cultures. Glycerine agar and egg media were employed. These cultures were incubated at 37° C. for several weeks. One pure culture of *Bacterium tuberculosis* was obtained from this material.

From the liver pieces were taken for sectioning from several different places. These pieces were fixed in Zenker's fluid, sectioned and stained. The stains used were hæmatoxylin and eosin, hæmatoxylin and picrofuchsin, and the Ziehl-Neelson stain.

Histological Examination of the Liver.—In certain areas the organ appeared practically normal, the cell bodies and nuclei

taking the stain well and standing out sharply, while in other areas small amounts of fibrin, together with cloudy swelling and fatty degeneration, were found. The tubercular areas were scattered irregularly throughout the tissue. These lesions varied in size from as large as two or three liver cells to an area covering several lobules. The structure of the lobules seemed to vary somewhat with their size. The smaller ones contained a centre made up of an irregular mass of giant cells. These cells were irregularly oval and varied somewhat in size. For the most part they showed a large, more or less homogeneous cell body, and many nuclei. The nuclei were sometimes collected in a mass in the centre of the cell, at other times they formed a ring, this not always being complete, and giving the appearance of a horse-shoe. At other times the nuclei were scattered irregularly through the cell. Surrounding this mass of giant cells could be found a rather thin connective tissue stroma, which contained a large number of small round cells, that appeared to be lymphocytes. This zone appeared to come into direct contact with the normal liver tissue. In lesions of this size the line of demarcation seemed to be very sharp between the normal and the pathological tissue. The different zones found in the avian tubercle could not be made out.

In some of the larger lesions a necrotic centre could be seen. This was surrounded by an irregular zone of giant and epithelioid cells. This zone was surrounded with a comparatively wider one made up of connective tissue stroma, infiltrated with large numbers of lymphocytes and polymorphonuclear leucocytes. This zone was circumscribed by a very narrow reactionary band consisting largely of lymphocytes. In these lesions, as in the above, the line of demarcation between the normal and pathological tissue was very sharp.

The largest tubercles, like the ones just described, contained a necrotic centre. In places parts of this had either become disintegrated or had dropped out while being sectioned, leaving vacant spaces. Scattered irregularly through this zone could be seen numerous giant cells, which had undergone more or less degeneration. Those nearer the centre showed a greater amount of degeneration than those nearer its edge. This zone gradually radiated out into another zone made up of connective tissue stroma containing large numbers of lymphocytes and polymorphonuclear leucocytes. This zone contained many giant cells scat-

tered irregularly throughout. The outer border of this zone seemed to come in direct contact with the normal tissue of the liver, so that, as in the above cases, the line of demarcation between the normal and the abnormal tissue was very sharp.

The examination of the specimens stained with the Ziehl-Neelson stain for the causative organism showed many tubercle bacteria. A few of these organisms could be distinguished scattered through the necrotic centre, but the organism occurred in large numbers in the zone made up of the connective tissue stroma and lymphocytes. This was especially true at the border of the lesion adjacent to the normal tissue.

The owner of the birds was informed of our findings, but he was unable to enlighten us in any way as to the source of the infection. He was advised to slaughter all birds showing excessive emaciation and to thoroughly disinfect the cages. This process should be repeated at short intervals as long as any signs of the disease could be found. In this way it was hoped to eventually eradicate the disease without destroying the entire flock.

REFERENCES.

- [1] BALDI. *American Veterinary Review*, vol. xxiv, p. 387.
- [2] BIERBAUM. *Zeitschr. f. Fleisch und Milch Hygiene*, vol. xvii, p. 311.
- [3] CADIOT, GILBERT and ROGER. *Recueil de Médecine Vétérinaire*, 1891, p. 22.
- [4] *Ibid.*, *American Veterinary Review*, vol. xx, p. 225.
- [5] CADIOT'S "Clinical Veterinary Medicine and Surgery," p. 525.
- [6] DREW. *Transactions and Proceedings*, New Zealand Institute, 1899.
- [7] FAGUNDES. Thesis presented to the Faculty of the New York State Veterinary College for the Degree of Doctor of Veterinary Medicine, 1906.
- [8] FREIDBERGER und FRÖHNER, vol. ii, p. 388.
- [9] LAW, First edition, vol. iv, p. 485.
- [10] MORSE. Farmers' Bulletin No. 390, U.S. Department of Agriculture.
- [11] SALMON. "Diseases of Poultry," p. 215.
- [12] SIBLEY. *Journ. Comparative Medicine and Veterinary Archives*, vol. xi, p. 317.
- [13] VAN ES and SCHALK. North Dakota Agricultural Experiment Station Bulletin No. 108, p. 3.

—From Report of New York State Veterinary College, 1913-1914.

Clinical Articles.

AN UNDIAGNOSED DISEASE.

By G. MAYALL, M.R.C.V.S.

I ATTENDED a bay mare cob in July for a sore on the off lip of her vulva and sores on her udder. These were treated with wound oils and antiseptic dusting powder, and although troublesome to remedy had apparently healed in about three weeks' time. The mare was then turned out to grass and was brought up again in the middle of September. I was then sent for to examine her. I found her covered with scabs from head to foot. One side of her vulva was deformed and eroded and her teats dropped off from the udder. Scrapings from the skin revealed purulent discharge underneath the scabs; a powerful lens and examination by Pugh's mange tray method revealed no acari. The mare was a brute to do anything with and two twitches had to be put on her to obtain any scrapings. Owing to the difficulty of any proper treatment, to avoid danger of infection (supposing there was any) and to safeguard against any accident to man incurred in treatment, the owners had the mare shot. Was the disease necrobacillosis? If so, it is the first generalized case I have ever seen.

SPINDLE-CELLED SARCOMA ON INSIDE OF CHEEK OF COLLIE DOG.

By CRITTENDEN ROSS, D.V.M.

New York, N.Y.

ANSWERING a call to see a collie dog on June 3 that was reported unable to eat, we found, upon examination, imbedded in the cheek a large tumorous growth which appeared necrotic and gave off a very offensive odour. At the owner's request the patient was treated but the client warned of the seriousness of the condition. Four days later, at the solicitation of the owner, the patient was operated upon. All efforts were used to remove the entire growth and both upper and lower maxillæ were curetted. In the centre of the growth was found a small tooth, resembling a deciduous incisor. Samples of this mass were sent to a local laboratory, also to Dr. B. F. Kaupp, of West Raleigh,

N.C. The former laboratory was quite busy at the time, and as the material was sent in the fresh state, only a report from gross examination was made, which stated that the material did not appear as if from a malignant growth, and that once thoroughly removed would not be apt to reappear. As a result of this report a second operation was performed, as the growth had returned in ten days. Shortly after this operation sufficient time had elapsed to receive word from Dr. Kaupp, which bore the information that the growth was a large spindle-celled sarcoma; but time was allowed to see the outcome before destroying the patient, which resulted in the return of the growth after a period of only eighteen days. The patient was then destroyed.—*American Veterinary Review.*

FOLLICULAR MANGE.

By H. S. EAKINS, D.V.S.

*Professor of Histology and Materia Medica, Division of Veterinary Medicine,
Colorado Agricultural College.*

VARIOUS authorities state that treatment of follicular mange in dogs is most unsatisfactory. As I noticed another item in this connection in the August number of the *Review*, I thought the veterinary profession would be interested in the following case reports:—

White English terrier entered clinic March 16, 1915. Squamous type of follicular mange very extensive over head, including face and ears; extensive over neck and shoulder regions; scattered over back, legs, and under surfaces of body. Parasite demonstrated. Hair was shaved from head, neck and shoulder regions where the lesions were numerous. Hand treatment with bristle brush, using *sapo mollis* and 2 per cent. aqueous solution of liquor *cresolis compositus* was a preliminary measure. After skin become dry iodine petrogen 10 per cent. was thoroughly rubbed into the skin wherever lesions presented themselves. In order to prevent the spread of the condition to the few remaining healthy skin areas, there was applied to these areas *oleoresina aspidii* and balsam of Peru in *linimentum saponis mollis*. Daily treatment with the iodine petrogen resulted in a rapid recovery, and the condition did not spread, due no doubt to the daily treatment of the non-affected skin areas with the above outlined combination.

Imported Japanese spaniel entered clinic July 13, 1915. Squamous type of follicular mange very extensive over entire head, being worst around the eyes and on the ears, and extended to forelegs. Pruritus was intense and dog was in agony. The right cornea had been scratched, resulting in an opacity. The long hair was clipped and preliminary treatment as in first case was given. The nails were clipped and infants' stockings were securely placed on feet, this in an effort to prevent scratching. To the lesions was applied daily equal parts of oleoresina aspidii and iodine petrogen, 10 per cent., being rubbed in well. The dog became quiet. The worst lesions succumbed to the above treatment in about seven days. However, the mange had spread to the body, hind legs, and tail; but was quickly brought under control with the iodine petrogen male fern treatment. A thorough examination of the patient three weeks after entrance to the clinic did not reveal a single lesion of mange. During the course of treatment, nuclein (for human use) was given subcutaneously every two days. The opacity of the cornea was overcome through a 1 to 2,000 cyanide of mercury aqueous solution.—*Journ. Amer. Vet. Med. Assoc.*

MILK FEVER IN A COW.

By G. MAYALL, M.R.C.V.S.

On October 3 I was called to a horned, crossbred cow, 5 years old, which my *locum* had attended a year previously for milk fever and had treated successfully in the usual manner. On my arrival I found the animal conscious with her head extended, grinding her teeth, and unable to rise. Temperature 100, pulse 45, respirations 24. I gave a draught composed of acid hydrochlor. dil. 1 drachm, tr. nux vom. 1 drachm, tr. gentian 1½ drachms, liquor taraxacum 6 drachms, water to a pint. An enema given at the time brought away a lot of black, lumpy, bad-smelling excreta. A second bottle of medicine as above was left. The next morning the cow was comatose, head turned round to flank, stertorous breathing, temperature 102. I injected the udder with 2 drachms of pot. iodide in 2 pints of warm water (I always prepare the injection at home and take it with me ready for use), blowing in plenty of air afterwards, and tying the ends of the teats with small bandages. The udder was then massaged, the bladder and rectum emptied, and a similar draught administered to that previously given and one left. The black and lumpy condition of the fæces was still present.

The following day the cow appeared considerably better. She had been up in the morning, but was down when I saw her, but quite conscious, breathing rapidly and a temperature of 105° F. I had her back and sides rubbed with liniment, a cold pack put round her horns, and gave her a draught made up of liquor

am. acet. $\frac{1}{2}$ oz., pot. nit. 1 oz., sodæ hyposulph. $\frac{1}{2}$ oz., water to 1 pint. A similar dose of medicine was left to be given at night. The bandages from the teats had been removed and the milk drawn. The black condition of the fæces still persisted, but the bowels were acting better.

Briefly, this cow continued to improve and on October 11 I ceased attending her and she has gone on all right.

The hurried breathing persisted, even to the last day I saw her, but the fæces had regained their normal colour and consistency, but as the bowels were not acting well on October 6 I gave a hypodermic injection of arecoline hydrobromide $\frac{1}{4}$ gr., physostigmine benzoate $\frac{1}{2}$ gr., strychnine sulphate $\frac{1}{8}$ gr. At this farm I have had two milk fever cases lately, both of which have recovered, but they have been followed by rapid breathing persisting for several weeks after apparent recovery from milk fever. The dark, tarry condition and bad smell of the fæces I have seen repeatedly in both cows and sows after parturition. Some cases of milk fever, clinically at any rate, show pronounced symptoms of an auto-intoxication.

Presumably owing to the difficulty of obtaining chinisol many practitioners will return to the use of pot. iodide. It has always served me well, and although I have frequently used chinisol satisfactorily, yet I have never seen any adequate reason for discarding pot. iodide and I have used it off and on for about fifteen years.

A PREMATURE BIRTH.*

By A. L. DANFORTH, D.V.M.

Watertown, N. Y.

AN interesting case came to my notice while at Goshen which I thought might be of interest to the readers of the *Cornell Veterinarian*. It was interesting to me in that I had never heard of so young a foetus being born and still live. It occurred on the farm of one of our clients and we were called by this owner asking if we cared to come and see it. The man keeps a careful record of his breeding stock, and there is no reason whatever for doubting the authenticity of the facts given.

Grade Holstein, aged 6 years, third calf. Freshened March 29, 1913, going full time, was bred again on May 15, 1913, and on October 22, 1913, gave birth to a live bull calf weighing 19 lb. The cow having been bred 160 days previously. The calf was apparently normal in every respect except for size. He was kept until February 11, 1914, and sold, at which time he weighed 140 lb. He was by a three-year-old registered Holstein bull.

I am wondering if there are on record any younger calves which have lived.—*American Veterinary Review*.

* Reprinted from the *Cornell Veterinarian*, July, 1915.

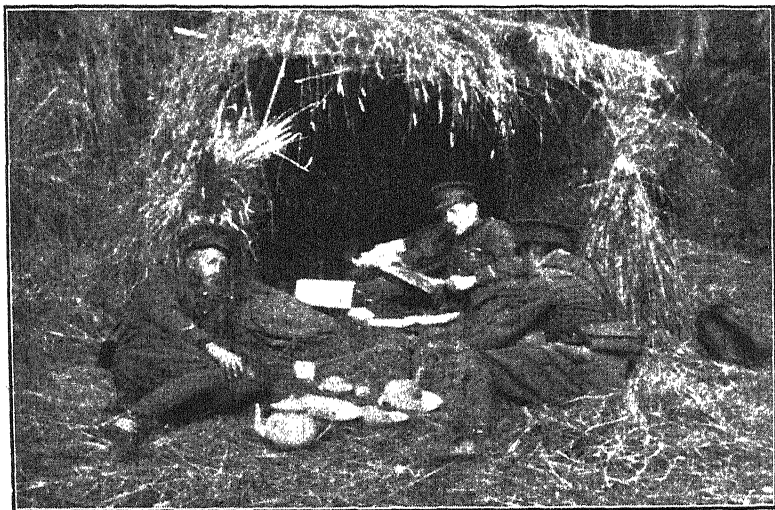
VIEWS TAKEN BY A BRITISH ARMY VETERINARY
OFFICER AT THE FRONT.



On the retirement from Mons, August, 1914.



A shell demolished this house and killed four men who were playing cards.
Ypres, November, 1914.



A friendly tea-party at Soupir, on the Aisne, September, 1914.



A Rest Camp. Horses on the line on the advance to Mons.

Translations.

PREMATURE BIRTH AND NORMAL BIRTH IN THE COW DURING THE SAME GESTATION PERIOD.

BY DR. A. SALVISBERG.

Tuannes.

PROFESSOR GUILLEBEAU recorded in this Journal for March two cases of premature birth and normal birth in the same animals. These cases are not only interesting to veterinary surgeons and breeders as exceptions to the rule, but they are important from a forensic point of view. A four-year-old Simmenthaler cow which had calved for the first time on August 20, 1912, was put to the bull on November 9 and December 30 in the same year. Afterwards no more heat was noted and the animal appeared pregnant. On April 23, 1913, I was called to examine the cow for a claw ailment. Whilst opening the digital abscess and bandaging the foot the animal struggled violently. Half-an-hour after this trifling operation the cow aborted a goose egg-sized foetus. On May 5 and 26, 1913, the animal was in season, but was not covered. On June 16, being on heat again, she was sent to the bull. Afterwards oestrus ceased. During the month of July the quantity of milk decreased and on October 16, 1913, the cow gave birth to a live bull calf, 50 kilogrammes in weight. About an hour after the birth a normal afterbirth came away, and after ten minutes a second. Each placenta was complete with a well-developed umbilical cord and without any putrefaction. The size of both placentæ was equal.

Doubtless the cow conceived on December 30, 1912, and carried twins, one of which was aborted on April 23, 1913. The two fully developed placentæ appeared worthy of note to me as well as the three heat periods repeated at intervals of twenty-one days during the pregnancy.—*Swiss Journal of Veterinary Medicine.*

SOME CASES OF POISONING BY TAXUS BACCATA IN GOATS AND HORSES.

BY HERMANN S. FRENKEL.

Pathological Institute, Utrecht.

In October, 1914, an owner reported the death of three goats and sent the carcase of one to the Institute for examination. At the same time two older goats were reported ill showing inappetence, groaning, discharge of white foam from the nostrils, great weakness and convulsions, and one died the following day. The animals had received grass, cabbage leaves, and fir needles. These latter led one to suspect poisoning by yew tree foliage. On section there was very advanced putrefaction. The intestines were tympanitic and there was diffuse hyperæmia of the

mucous membrane of the intestine and abomasum. The rumen wall was very rotten and the chyme firmly glued to the mucosa. In the green contents of the rumen were found numerous, entire, equal-sized, 3 cm. long and 4 mm. broad, linear leaves. The reticulum, the omasum, the abomasum and the intestines were empty. The lungs showed intense cedema.

The author concludes these were cases of taxus poisoning. Rumination ceased immediately after taking this food, and the poisonous principle of yew leaves "taxin" was quickly taken up from the rumen and incorporated in the digestive juices.

A military horse which died in a few minutes furnished another case. Oats, chop, pieces of grass, entire and chewed yew leaves were found in the stomach on *post-mortem*. The blood was dark reddish brown and clotted badly. Examination for anthrax was negative. The leaves and pieces of leaves collected from the stomach weighed 200 milligrammes, which was a thousandth part of the lethal dose. Frenkel believes that the amount taken must have been greater than that found and that the juices of the stomach quickly changed the leaves and made them unrecognizable, and at the same time much of the stomach contents had escaped into the intestine. Two other military horses in the same yard had access to yew trees and one was found dead and the other died quickly, showing great prostration and a markedly slow pulse. Another military horse showed symptoms of great unrest, violent sweating, great weakness and decubitus. The excrement was dry and dark coloured, the breathing rattling and the breath stinking. Portions of food and slime were discharged through the nostrils. The horse was slaughtered and section gave rupture of the stomach. Taxus needles were found in the stomach contents.

The conclusions the author draws are partly contrary to those hitherto given on taxus poisoning. It appears that yew leaves mixed with other food and taken immediately after feeding may be unaccompanied by any violent symptoms and that the animal may slowly become accustomed to the taxus poison. Further, the occurrence of poisoning depends on the individual disposition. It appears that young, clear green coloured leaves and twigs of *Taxus baccata* are not poisonous, and that the toxicity depends on the oldness of the parts taken. In opposition to the conclusions of Romberg and Ehrenberg, Frenkel considers that goats are very susceptible to the poison.—*Swiss Journal of Veterinary Medicine*.
G. M.

Reviews.

Anæsthesia and Narcosis of Animals and Birds. By Frederick T. G. Hobday, F.R.C.V.S., F.R.S.E. Demy octavo; pp. xii + 86; plates 5; figures in the text 19. Price 5s. net. Baillière, Tindall and Cox, 8, Henrietta Street, London, W.C.

It has often been written and said that all veterinary surgeons use anæsthetics nowadays, and yet this is the first book giving expert guidance on the subject. It will prove of inestimable value to the humane veterinary surgeon, to the practitioner who has used anæsthetics for some time, to the student, and to the man starting in practice who wishes to avoid some of the pitfalls due to an incomplete knowledge of the forces which he endeavours to summon to his own aid and to alleviate animal suffering. No man in our own profession could come to the task of writing about anæsthetics with a wider or more extensive experience of his subject than the author. With perfect trust and confidence, then, this little book may be recommended whole-heartedly to all those who wish to be in the front rank of the science and practice of their professions, and its pages ought to appeal to an even wider public than is comprised within our limited circle.

The work is dedicated to Professor Augustus Waller, M.D., F.R.S., Professor of Physiology in the University of London, "whose work on the administration of chloroform has done so much to demonstrate the safety of this anæsthetic when given by dosimetric methods." The Professor and Mr. W. L. Symes, M.R.C.S., have given the author every encouragement in his work, and Professor Wooldridge and Mr. Victor Fisher (Managing Editor of THE VETERINARY JOURNAL) have lent valuable aid.

The little volume is divided into eleven chapters, the greatest space being naturally taken up with general and local anæsthetics. There is an advanced and interesting chapter on intraspinal anæsthesia (confined almost entirely to the dog) which is well illustrated, whilst a short section devoted to narcotics is very acceptable. In this latter connection we should like to have read the author's opinion on the best and quickest narcotic for destroying the horse. Recently we were asked to put a favourite old cob to his final sleep, and we accomplished it by giving chloral by the mouth and rectum, but it took about 12 oz. of the drug to accomplish the end.

Guidance is given in plain language on the use of all the general and local anæsthetics, and antidotal treatment and treatment of the patient when recovering from the hypnotics are discussed. Chloroforming standing is explained, and those who advocate this method will benefit by reading the author's lines on the matter.

There is no branch or phase of the subject that has been overlooked. The information given is concise and complete. The illustrations are good. We are indebted to the writer for pioneer work in a field in which we, as humane and skilled men, must

advance. No more opportune moment than the present could have occurred for the birth of a book which marks an epoch in the literary and scientific history of our profession. (G. M.)

The Annual Report of the Chief Veterinary Officer for 1914.

Board of Agriculture and Fisheries. Publishers: Wymans and Sons, Limited, Fetter Lane, London, E.C. Price 3d.

Sir Stewart Stockman having been busily engaged in research into the treatment of swine fever by serum and vaccination the issue of this report has been somewhat delayed. Foot-and-mouth disease has been pretty prevalent, eleven outbreaks in the county of Lincolnshire in the district of Lindsey helping to swell the total considerably. Eight other cases in various parts of England occupied the attention of the officials, and all the outbreaks were successfully dealt with in the usual way.

There was an increase in the number of cases of swine fever, but the total pigs slaughtered by the Board was proportionately smaller than in previous years. A report has been prepared by the Chief on the treatment of the disease by serum and there is reason to believe that great use will in future be made of the method in the control and eradication of the epidemic.

Glanders shows a decrease due chiefly to a wide recognition of the use of mallein in the extermination of the disease. A word of caution is given as to the acceptance of certificates of freedom from glanders when purchasing new ponies for the pits. A certificate brought with a pony to be sold may not apply to the animal or be of too ancient date to be valuable. Russian ponies were, as usual, the chief hosts of infection, eleven out of eighteen of the cases concerned them.

Only 722 outbreaks of anthrax were confirmed out of 1,150 suspected cases investigated. A dog and two cats died from eating the flesh of anthraxed carcasses, and some animals bedded on shoddy caught the complaint; whilst two horses, the one carting hides and the other dragging an anthraxed cow carcase, died from the malady.

Sheep scab shows a decrease and tuberculosis in swine an increase. From cases encountered at the abattoirs in Glasgow and Birmingham and in making investigations into suspected swine fever cases it is assumed that probably 3 per cent. of swine may be affected with tuberculosis, so that measures to prevent the occurrence of the disease are worthy of notice.

The Tuberculosis and Mange Orders have been suspended during the War, and no very enlightening information is obtainable about them. 2,892 cases of swine erysipelas were encountered. New laboratory premises are now being constructed by the Board and a supply of serum and vaccine for swine erysipelas will soon be available. The manufacture of anti-swine fever serum has already been begun by the Board, and up to the end of December 137,000 c.c. had been distributed for use.

Redwater and epizootic abortion were the subjects of investigation by the Board. Experiments with vaccine in the latter disease have given encouraging results.

A full report in connection with the results obtained with anti-swine fever treatment in practice is promised.

There is evidence of gratifying advance in the activities of the Board and the benefit that stockowners and the general public are getting from the work of this State Department deserves to be appreciated.

ARMY VETERINARY SERVICE.

ARMY VETERINARY CORPS.

APPOINTMENT of W. F. Morton to be temporary Lieutenant; temporary Lieutenant W. F. Morton to be temporary Captain; G. Whitehead to be temporary Lieutenant; Lieutenant C. A. A. Ewin to be Captain; Lieutenant H. McVean to be Captain; Lieutenant A. Scotson relinquishes his commission on account of ill-health; Temporary Lieutenant R. J. Collings to be temporary Captain; temporary Lieutenant P. A. Wilks relinquishes his commission; Temporary Major E. E. Bennett to be temporary Lieutenant-Colonel whilst holding appointment of Assistant Director of Veterinary Services. Captain J. O. Andrews to be temporary Major whilst holding appointment of Assistant Director of Veterinary Services. Temporary Lieutenants to be temporary Captains: A. Young, W. D. Halfhead, J. McL. Dawson, E. A. Phipps, A. R. Smythe, E. S. Dixon, J. S. Young, W. W. Lang, E. E. Jelbart, D. Hannay, A. C. Smart, J. B. Walker, R. C. Allinson, J. E. Young, J. Godber, R. P. Johns, J. P. Dunphy. The following to be temporary Lieutenants: A. Plant, W. Gardner.

Lieutenant H. Chown, from S.R., to be Lieutenant; temporary Lieutenant W. Scott to be temporary Captain.

Temporary Captain F. C. Gavin to be temporary Major, while holding appointment of Assistant Director of Veterinary Service; temporary Lieutenant L. S. Sedgwick relinquishes commission on ceasing to be employed.

W. F. Wright to be temporary Lieutenant.

J. R. Welsby to be Lieutenant.

Lieutenant G. McIntyre to be Captain.

Temporary Lieutenants to be temporary Captains: E. Nicholson, W. H. Priston, C. W. Makinson. Canadian veterinary surgeons to be temporary Lieutenants: J. C. Miller, W. F. Macdougall, J. W. Welch, T. W. McMahon, J. R. C. Andrews.

Temporary Hon. Lieutenant E. G. R. Fairholme to be a Deputy Assistant Director of Veterinary Services (graded for purposes of pay as a Staff Captain), and to be temporary Captain whilst so employed.

Temporary Lieutenants to be temporary Captains: R. T. Davis, J. Hill, T. Hogg, R. J. Little, H. J. Allen; J. Purdy to be temporary Captain; W. F. Llanagan to be temporary Lieutenant; W. H. Mawdsley to be temporary Quartermaster with hon. rank of Lieutenant.

Temporary Lieutenants to be temporary Captains: J. M. Smith, J. Pugh. Temporary Lieutenant F. C. Gillard relinquishes his commission on the termination of his engagement; temporary Lieutenant P. A. Robinson relinquishes his commission.

W. H. Williamson to be Lieutenant.

Temporary Lieutenant J. Pollard to be temporary Captain.

OBITUARY.

WILLIAM HENRY JONES, M.R.C.V.S., of Chatham, died on May 28, at San Francisco, California, U.S.A., from rheumatic complications. Graduated July 1, 1875, London.

Veterinary-Major GERALD HERBERT FENTON, late Army Veterinary Corps. Died on October 2, 1915, aged 63. Graduated April 16, 1874, N.Ed.

Captain JOHN STORIE, A.V.C. (T.F.), East Linton, Prestonkirk, Haddingtonshire. Died on October 4, 1915, aged 59. Graduated April 10, 1875-1880, N.Ed.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

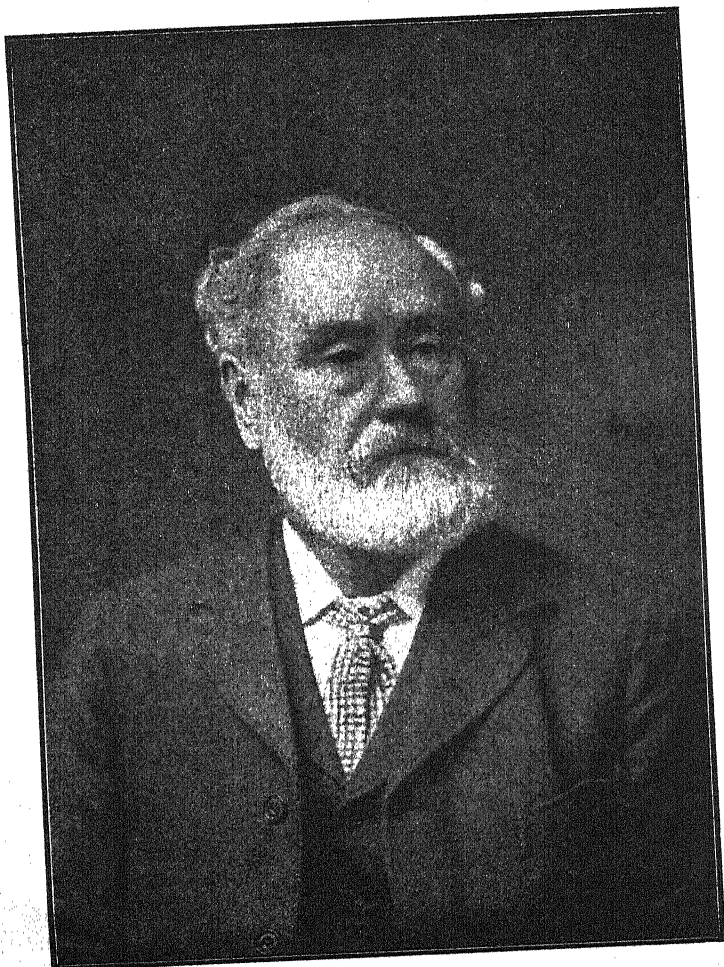
Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.





THE LATE PRINCIPAL JAMES McCALL, F.R.C.V.S.

THE VETERINARY JOURNAL

DECEMBER, 1915.

Editorial.

PRINCIPAL JAMES MCCALL, F.R.C.V.S.

By "AN OLD STUDENT."

By the death of Principal McCall a great man has passed out of the ranks of the profession. He was a big man and a strong man. For fifty-two years he has guided and directed the activities of the Glasgow Veterinary College. On many individual members of the veterinary profession he has left his beneficial impress, and on the body itself his influence has been all for life and progress. As a teacher he was unsurpassed, and as a wise and kindly adviser to his pupils he was respected, honoured, and esteemed. His lectures on veterinary medicine and surgery were stamped by sound and extensive experience, were lucid and authoritative, and occasionally rendered humorous or lightsome by apt quotations from Scotland's national poet. His large city practice gave him full play for his observant and deductive faculties and he profited thereby and benefited others therefrom. As a consultant he was a model of what an adviser ought to be and his opinion given after due deliberation and consideration could always be counted on to be based on present facts and past experience and to be judicial, valuable, and entitled to respect.

When in his youth he forsook the lawyer's office for the study of veterinary science he only showed the independence of spirit which he exhibited on many occasions afterwards in regard to questions affecting his own College, city, or the policy of our body.

He was a builder and creator in his special sphere and he possessed all the patience, perseverance, diplomacy, and acumen necessary to the successful prosecution and construction of advance movements.

In 1863 the Principal got his College established. In 1865 he took a prominent part in the suppression of rinderpest, a part that was later on equalled by his attitude towards tuberculosis and glanders in the City of Glasgow. He was an agriculturist and farm owner and a well-known breeder of Clydesdale horses and Ayrshire cattle, as also a trusted judge of stock at many agricultural shows. Through his efforts and instrumentality the public veterinary health service in Glasgow was established, and since it has become a pattern in all that is good for other cities and towns. In 1909 he was successful in having the College transformed from a private to a public institution, with a duly appointed board of governors and approved by the Scotch Education Department. The Principal's life was rich in achievement; he never stood still; he moved with the times, and not infrequently he was sagacious and far-seeing enough to move in advance of them and carry with him the best public opinion.

The length of active service on the Council and in the profession of the subject of our memoir has hardly been surpassed and never perhaps equalled in its usefulness. He held an almost unique position among us in many ways. He was always a genial, well-informed gentleman who graced our ranks. He served his day and generation well, and of him it may be truly written:—

Life's race well run,
Life's work well done,
Life's victory won,
Now cometh rest.

FOOT-AND-MOUTH DISEASE AND TUBERCULOSIS.

A RECENT leaflet of the Board of Agriculture calls attention to the cause, symptoms, method of spread of foot-and-mouth disease and the importance of prompt notification in instances and suspected cases of the disease. With such a large number of our members being on active service it is likely that outbreaks will not be so quickly detected or notified as formerly, and the danger of spread of the disease is consequently all the greater. The leaflet seems to indicate that the authorities have now come to the definite conclusion that rats, fowls, birds, cats, horses, and dogs may act as carriers of the virus. It is suggested also

that human beings may also convey the disease to animals. A good deal of evidence has been collected which goes to show that a human being may convey infection through his clothes. The origin of many outbreaks appears to be wrapped in mystery, or, at any rate, not to be plain. It is questionable whether any efficient measures can ever be taken to prevent some outbreaks, but prompt notification of the disease and suspected cases of it, combined with sanitary police regulations, are beneficent and generally pretty effective. Considering the insidious nature of the disease careful watch is always necessary. A wide knowledge among the agricultural community of the chief facts in connection with the epizootic is very desirable at the present time, and when the War terminates the importance of extra vigilance is indicated, hence for these reasons the leaflet is a very valuable and opportune one indeed. The suspension of the Tuberculosis Order seems to be chiefly due to a desire by the authorities to retrench in expenditure. The Order has done good in the past by making agriculturists give a due sense of proportion to the occurrence of this disease. The accentuation of the danger and loss due to the spread of infection from animal to animal has doubtless had quite as much effect in producing a desire to suppress the malady as any consideration of the human danger factor, for "every one is as God made him and often a great deal worse." We think, too, that really the Order has indirectly done good propaganda work, for there is hardly a corner of these Isles that can now be unacquainted with the fact that there is such a disease as tuberculosis in cattle. Some further attention in the interests of prevention may be directed to the by no means rare occurrence of the malady in pigs and fowls. The cough and sore throat cases will be more critically examined, the lumpy bags more carefully discriminated, and the screw will not be so easily disposed of as heretofore. Although the Order is not now in force, and the compensation inducement to slaughter does not apply, yet we hear and have personal knowledge of a prevalent desire to eradicate the "piner" and "waster" from the cow-house. This is all as it should be, and some day, perhaps, the prominent part which the veterinary profession has taken in bringing about betterment of procedure in this case will be appreciated and recognized at its true value by the general public.

G. M.

General Articles.

SOME INTERESTING STUDIES OF THE FOWL.

By DR. B. F. KAUPP.

Pathologist, North Carolina Experiment Station, W. Raleigh, N.C., U.S.A.

A STUDY OF THE ABDOMINAL YOLK.

THE yolk is formed in the ovary of the hen. It has its origin in a minute sphere containing a nucleus. This nucleus marks

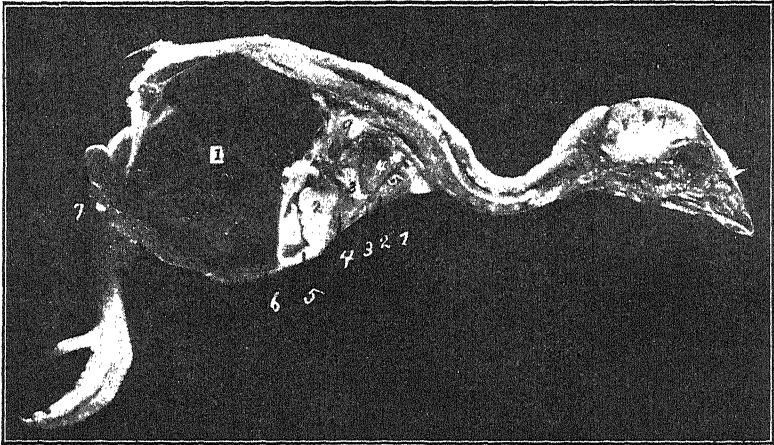


FIG. 1.—Baby chick just hatched.

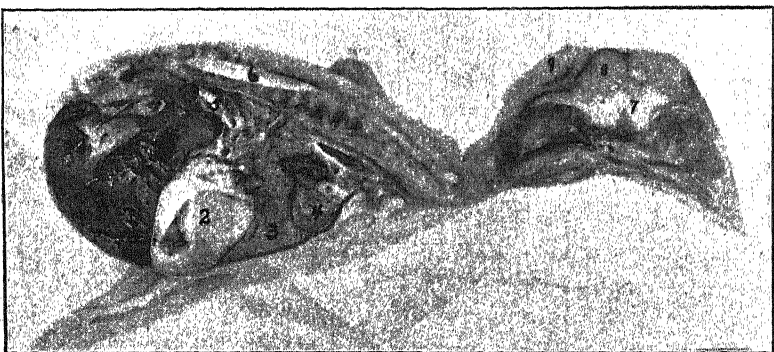


FIG. 2.—Longitudinal section of baby chick.

the point of development of the embryo chick after fertilization. The nucleus in its primary state is located in the central portion of the primary ovum. When the ovum begins the development

of the yolk there is noted at first a deposit of fine granules of yolk material around the central nucleus. These granules of yolk material gradually extend toward the cell wall. The deposit is known as the latebra or the flask-shaped mass of white yolk

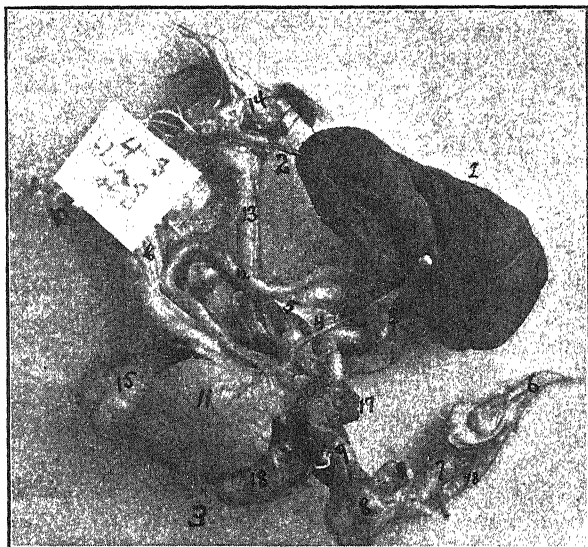


FIG. 3.—Dissected visceral organs of baby chick.

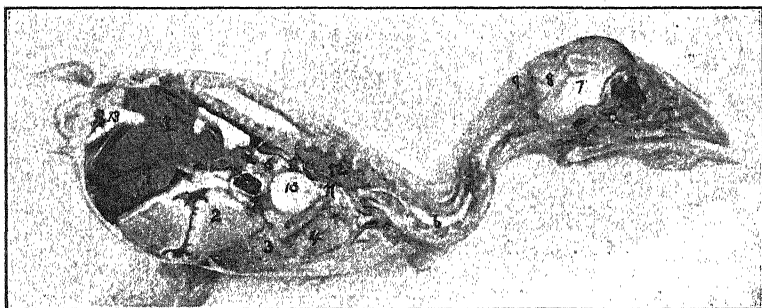


FIG. 4.—Section of baby chick.

forming thin layers upon layers of yellow yolk. Later the nucleus occupies a position at one side of the yolk and just under the vitelline membrane.

We have taken the weights of 1,454 S.C. White Leghorn eggs and have found the average weight of these to be 57.8 gm.

The yolks were carefully separated from ten eggs and the average weight was found to be 17.78 gm.

In the formation of the body of the chick the yolk is enclosed in the abdominal cavity and the vitelline membrane becomes the abdominal yolk-sac.

In a study of ten chicks that had started to pip the shell and had died it was found that the unabsorbed yolk, on an average, weighed 8.5 gm., or 47 per cent. unabsorbed. There appears

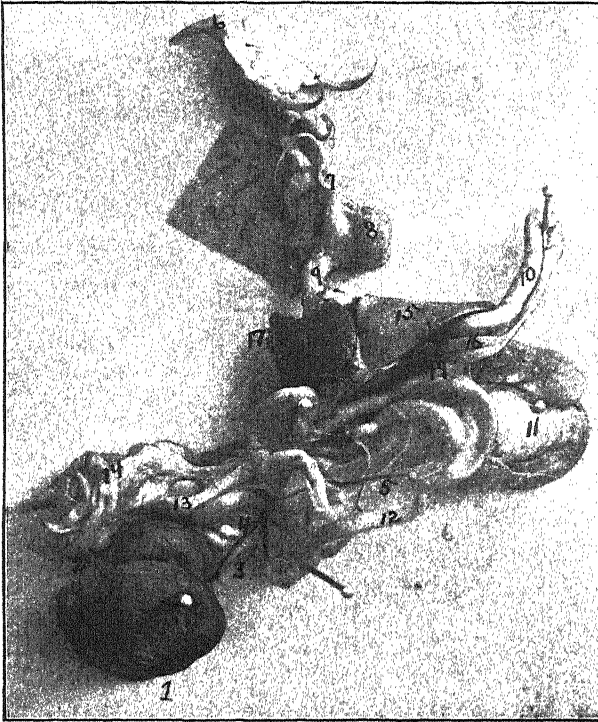


FIG. 5.—Dissected visceral organs of baby chick.

to be no absolute or definite amount of yolk left in the abdominal yolk-sac at the time of hatching. It was furthermore found that the rate of absorption of the yolk varied in different individuals even when the eggs were from the same flock and apparently of the same vigour. Thus it will be noted that in fig. No. 6 which is a photograph of a chick ninety-six hours old, there is a greater absorption of the abdominal yolk than in No. 7, which is 120 hours, or 5 days old.

In all 110 baby chicks were studied. Of these forty were killed by aid of chloroform at different ages and skinned and the carcasses immediately placed in 10 per cent. formaldehyde solution. Later these carcasses were sectioned longitudinally and the amount of unabsorbed abdominal yolk noted. The experimental chicks received neither feed or water.

Section No. 1 shows a baby chick just hatched; No. 1 shows the abdominal yolk-sac. It will be noted that the abdominal viscera are crowded up against the thoracic cavity. No. 2 is the gizzard, No. 3 is the liver, No. 4 is the heart, No. 5 is the sternum of breast bone, No. 6 is the spinal cord, No. 7 is the cerebrum, and No. 8 is the cerebellum.

In Section No. 2 we have a baby chick twenty-four hours old. It will be noted that some of the abdominal yolk has been



FIG. 6.—Section of baby chick.

absorbed, and that the gizzard, intestines, and liver have settled back toward their normal location. Nos. 1 to 4, inclusive, represent the same as in fig. 1, No. 5 is the intestines, Nos. 6, 7 and 8 are the same as in No. 1, and No. 9 is a small quantity of fat in the post-occipital region.

Section No. 3 represents the visceral organs removed from a baby chick forty-three hours old. No. 1 shows the abdominal yolk-sac, which weighs 5 grm. That is, in this chick in forty-three hours there was absorbed 3.5 grm. of yolk on the assumption that the yolk-sac contents originally weighed 8.5 grm. No. 2 shows the vessels from the yolk-sac to the somatic. No. 3 is the short vessel of the abdominal yolk-sac which enters the wall of the posterior portion of the small intestines. No. 4 is the long vessel of the yolk-sac which enters the mesenteric blood-vessel,

which is better shown in the dissection at seventy-seven hours old. The long vessel of the yolk-sac is much smaller in calibre than the short vessel. No. 5 is the mesentery, which unfortunately became torn before the photograph was made. No. 6 is the tongue, No. 7 the first portion of the œsophagus, No. 8 the crop, No. 9 the second portion of the œsophagus, No. 10 the duodenal loop, No. 11 the liver, No. 12 the floating portion of the small intestines, No. 13 the large intestines of rectum, No. 14 the somatic umbilicus, No. 15 the gizzard, No. 16 the pancreas, No. 17 the lungs, No. 18 the heart, No. 19 the small intestines.

Section No. 4 is a baby chick forty-eight hours old. The Nos. 1 to 9 are the same as in fig. No. 2. No. 10 is a section through the proventriculus, and No. 11 is the second portion of

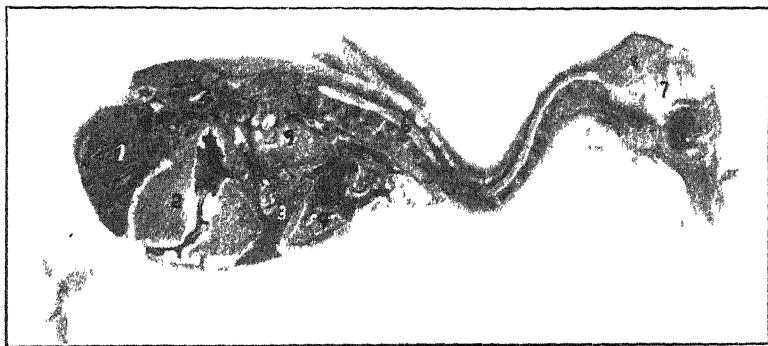


FIG. 7.—Section of baby chick.

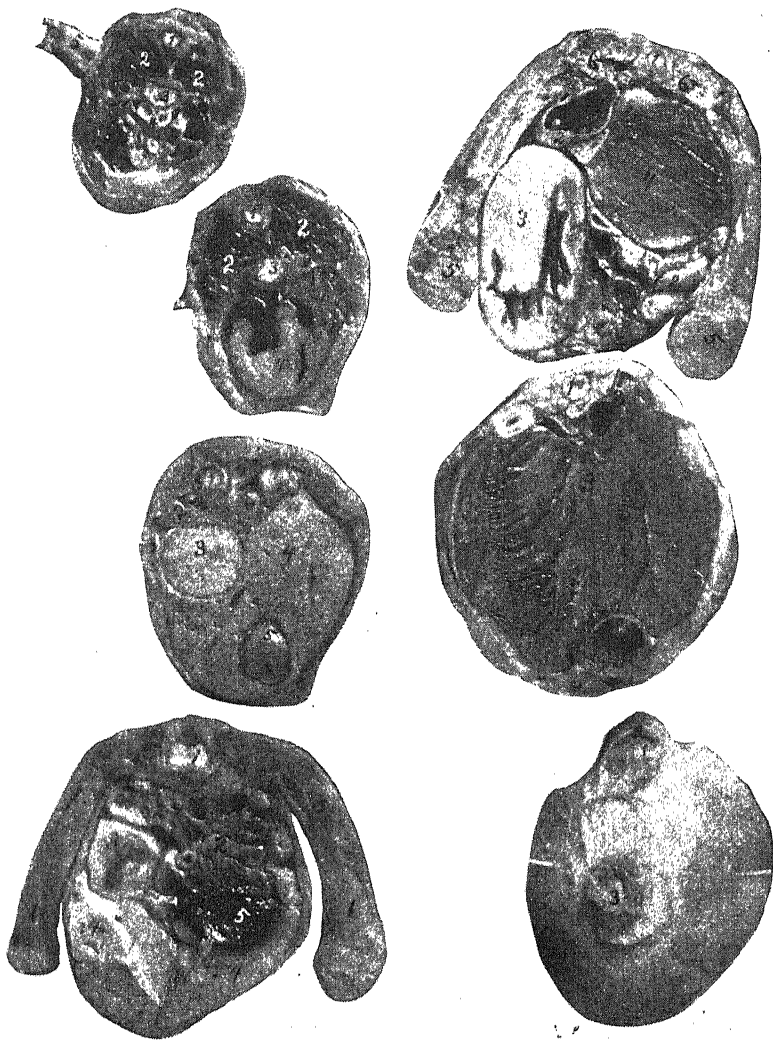
the œsophagus. No. 12 is the lung, showing it partly filling the intercostal spaces. No. 13 is the cloaca, which has partly been laid open by the incision. It will be noted that at the end of forty-eight hours there has been quite an absorption of the yolk or reserve food.

Section No. 5 is a photograph of the visceral organs removed from a baby chick seventy-seven hours old. The numbers represent the same as in fig. No. 3. The abdominal yolk-sac in this chick still contains 3 grm. of yolk. The yolk appears much paler, indicating a possibility that the absorption of the fatty portion which contains the lipochrome is much more rapid than the purely albuminous portion. However, as there was no analysis made at this time, this remains mere speculation.

Section No. 6 is a longitudinal section through the body of a

baby chick ninety-six hours old. Nos. 1 to 12 are the same as in No. 4. The abdominal organs are all in their normal positions.

Section No. 7 is a section through a baby chick 120 hours, or



FIGS. 8, 9, 10, 11, 12, 13, 14.—Transverse sections of baby chicks.

5 days old. The Nos. 1 to 8 inclusive are the same as in fig. 6. No. 9 is the proventriculus.

Section No. 8 is a transverse section through a leavel at No. 1, fig. 1. No. 1 is the spinal cord, No. 2 the apex of the lungs,

No. 3 the œsophagus. Section No. 9 is a section through fig. 1 at 2. No. 1 shows the sectioned surface of the vertebra and spinal cord, No. 2 is the lungs, No. 3 the œsophagus, and No. 4 the heart.

Section No. 9 is a transverse section through the baby chick at 3 in fig. No. 1. No. 1 is the spinal cord, No. 2 the small intestines, No. 3 the proventriculus, No. 4 the liver, and No. 5 the apex of the heart, which at this point pushes backward, occupying the anterior portion of the fissure formed by the right and left lobes of the liver.

Section No. 10 is a section through a baby chick at 4 in fig. 1. Nos. 1 to 4 inclusive are the same as in section No. 9. No. 5 is the gall-bladder.

Section No. 12 shows a transverse section through a leavel at 5, fig. 1. No. 1 is the spinal cord, No. 2 the intestines, No. 3 the gizzard, No. 4 the anterior portion of the abdominal yolk-sac, No. 5 is the femoral region, and No. 6 a section through the kidneys.

Section No. 13 is a section through the body of a baby chick at 6, fig. No. 1. No. 1 is the spinal cord, No. 2 the rectum, and No. 3 a section through the abdominal yolk.

Section No. 14 is the posterior abdominal wall. No. 1 is the anus, and No. 2 the somatic umbilicus.

SUPPURATIVE INFLAMMATION OF THE GIZZARD OF THE COCK WITH ACUTE INFLAMMATION AND BOTH ACTIVE AND PASSIVE CONGESTION OF THE LIVER WITH HÆMACIDEROSIS.

History.—The subject was a single-comb, Rhode Island red cock, 2 years old. This cock was used as a breeder on the Iredell Test Farm. The first symptoms noted were slight diarrhœa, mopingness, and no interest in life. He became gradually weaker, and died on July 20, 1915.

Autopsy.—The carcass was thin, there being an absence of retroperitoneal fat. There was a suppurative inflammation of the posterior half of the gizzard. The posterior portion of the gizzard cavity contained a quantity of cheesy pus (see fig. 15, No. 3). The liver weighed 60 gm., and presented a greyish appearance. The testes were in an atrophic condition.

Microscopic Examination.—A section of the gizzard, including a portion of apparently normal gizzard tissue, was prepared and

sectioned and stained with hæmatoxylon and eosin. A portion of the adjacent muscle was densely infiltrated with polymorpho-nuclear leucocytes as well as a zone of newly formed connective

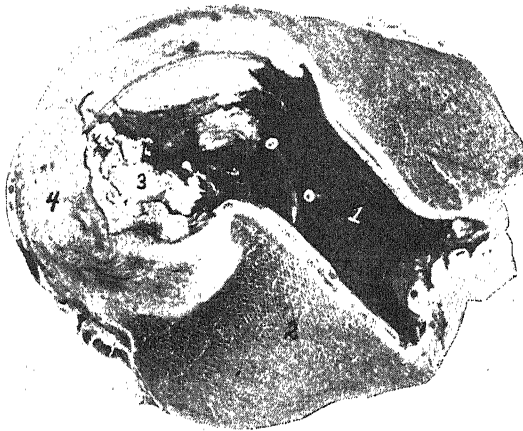


FIG. 15.—Suppurative inflammation of gizzard. 1, lumen of gizzard ; 2, normal musculature of gizzard ; 3, cheesy pus in lumen ; 4, suppurative inflammation.

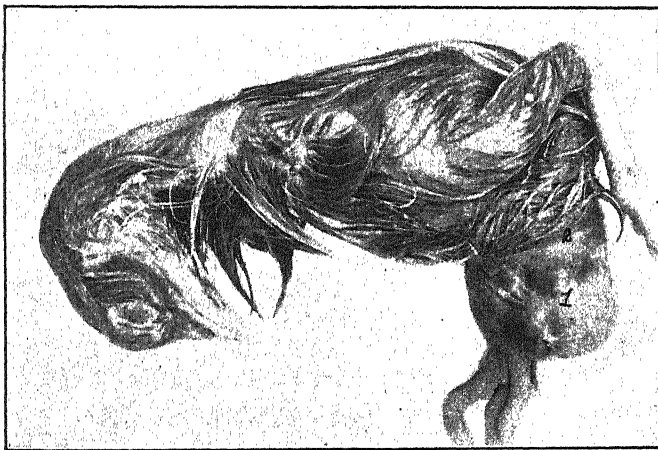


FIG. 16.—Umbilical hernia in baby chick.

tissue. There was apparently a chronic suppurative inflammation.

Sections of the liver prepared and stained with hæmatoxylon and eosin showed intense active and passive congestion with

hæmaciderosis. There was an acute inflammation, the polymorphonuclear leucocytes appearing more densely packed around the blood-vessels. In some places the inflammation appeared rather diffused, while in other parts of the liver it appeared to have a tendency to focalized areas.

UMBILICAL HERNIA OF THE CHICK.

We have examined many chicks in cases where they have died after partly pipping out of the shell. The shells were carefully removed and an examination, in many, showed a rupture at the somatic umbilicus or the point of the attachment on the umbilical cord. At this point the abdominal wall is very thin and is not reinforced by elastic tissue, as in quadrupeds. If the shell membrane becomes very dry and tough the straining by the chick in its efforts to free itself may prove fatal. Fig. No. 16 shows a hernia as a result of excessive straining. No. 1 is the hernial portion (the portion of the abdominal yolk-sac forced out), and No. 2 is the umbilical ring.

THE ARMY HORSE SUPPLY.

By G. MAYALL, M.R.C.V.S.

THE supply of horses from Great Britain and Ireland for the country's Army has been insufficient. A greater deficit must have arisen if the numbers had not been kept up by a healthy foreign demand previous to the War, backed up by the offer of an adequate and in many cases lucrative price for the breeder. Horse-breeding can only be carried on profitably when the business pays. This is a simple, self-evident proposition which has frequently been ignored in the past, but which must be considered before advance can be made. It is the root factor in any attempt at reform in this question, and all operations having for their object the encouragement of Army horse-breeding and the furnishing of an adequate equine supply for military needs which overlook the importance of the fulness of the purse are doomed to defeat and failure. The powers that be must look at the matter in this country in a broader and more liberal spirit than they hitherto have done. A modest estimate made by the Committee of the Brood Mare Society in 1909 was that £50,000 a year was only just enough to make a beginning in setting our light horse supply in order. If the advice of knowing men had been accepted, then the position would have been better to-day. At that time France was expending £185,000, Germany £370,000, and Austria £210,000 annually in the maintenance and increase of their horse total. Drawing a line through this statement of fact it will thus be seen that the recommendation of the Brood Mare Committee hardly erred on the side of extravagance. So far about £40,000 has been the highest annual sum yet devoted to horse-breeding operations here, and lately this amount has dropped to about £30,000. If voluntary principles have to apply in horse-breeding matters the next most important factor to the patronizing and fostering of equine production is that an adequate price be given for the animals produced. It has been shown in a previous article in *THE VETERINARY JOURNAL* (April, 1915) that a price of £40 to £45 for a four-year-old remount for the trooper is inadequate. There are many authorities who state that this assertion can be proved without a shadow of doubt and we agree with them. As payment for the right type of horse it is insufficient; as an inducement to encourage further breeding of the

type it is paltry. A move in the direction of getting over the difficulty may be made by buying three-year-olds at these prices or thereabouts and giving an enhanced value for four-year-olds. The importance of supporting breeding and making it pay becomes more and more evident every day, for the commandeering of a supply of horses already made or present as a means of satisfying the Army's needs is only a temporary measure of expediency which takes no thought of the future. The extraneous co-helpers, in keeping up the supply in the home country, are gradually dwindling owing to the advance of motorism on all sides. A source of revenue to the land is being neglected. Money that should circulate here is passing away for the benefit of strangers. We must bring renewed prosperity to the countryside by organizing and administering effective and prosperous measures of production. It is an anomaly and a reflection on us as a nation that our oldest and most vital industry is perhaps the worst organized and one of the most poorly paid in the whole category of our human activities. It is to the pastoral community and not to the business and trading classes that the authorities of the nation must look for hope in regard to future adequate horse supply and for deliverance from scarcity and scantiness. The spring is in the land and the fountain on the pastures and we need to turn our eyes towards them.

Before any business can be run properly and an estimate be given as to the likely results that can be turned out it is usual to survey the plant and take stock of the raw material present. In the case of horse-breeding the country represents the plant and the mares and stallions the stock. A great many of the most suitable parts of the country for breeding operations are already known and others may be discovered. No partiality founded on imperfect knowledge, regional preferences, or district favouritism will be advantageous. The truth is that one part of the country may be suitable for breeding cavalry horses, another place be fitted for rearing artillery horses, and a third be just the region for the production of transport quadrupeds. Again, one neighbourhood may be noted for the furnishing of hardiness and stamina, another for the granting of speed and bone, and a third for the creation of size and power. Military movements are conducted in countries with varied physical surfaces, and the horses of the plains may not do well or be at all serviceable in hilly and moun-

tainous regions. Suitable horse supply bears a close relation to the topographical features of the country to be operated in.

Have we a sufficient stock of suitable mares for our requirements? We think not. A reliable census taken by experts of the class of animal required to be the dam or sire of a given military type is needed, but this will not be furnished by employing in its compilation policemen, jobmasters, or ancient mariners. From the point of view of usefulness the last horse census was a fiasco. The reason was obvious. It did not need in its production a knowledge of hidden forces, but only a judgment as to what class a horse belonged to, and yet it was a lamentable failure. A good plea may be put in for the employment of veterinary surgeons in this connection. The Royal Commission on Horse-breeding called attention to the fact some time ago that many of the breeding districts in the country required re-stocking with brood mares. Available sources of supply must therefore be tapped and the needed material purchased. Coincidentally the number of stallions needs augmenting, and this end may in part be furthered by putting a check on the exportation of these founders of essential stock. No scientific approach to the production of the best results in breeding will ever be made unless the matters of stock getting, fertility, vigour of progeny, soundness of sire and dam, and other features in connection with zootechny are understood and explored. Of what use is it to tell us that stallions, whether King's premium or not, have served so many mares unless we know how many live foals the dams have produced and how the stock has turned out. We read of laymen quoting with apparent pride that a stallion has served an average of sixty-seven or sixty-nine mares in one season, but we see no account of the number of foals accruing from his energies, and we do not forget that from forty to fifty jumps for a pure bred stallion is considered sufficient in France, where they take more exact note of zootechnical matters than we do here and have more controlled fields of observation to collect reliable statistics. Running over the number of mares to stallions in studs in Germany we get about the same figure as in France. Over use is not desirable but prejudicial, and useless use is a profitless operation leading to decay and sterility.

In connection with research into breeding matters we note that in 1912 an offer was made by Captain Part to furnish £10,000 for the improvement of light horse breeding. An experiment in

Mendelism was recommended by the authorities. We think the money might have been put to better use. We have never heard yet how the Mendelian experiments helped the science of horse-breeding in this country or what really valuable information was derived from them either economically, intrinsically, or zootechnically.

Reverting to our plant and stock simile, the next step in the conduct of a successful business is to have a good supply of, and a lucrative demand for the produced horses. The demand must be kept constant and steady and the supply reliable and sufficient. These essentials can be achieved by scientific knowledge, good organization, and sound finance.

The men who buy and the men who sell must do business together and do it directly to obtain the best results. Breeders should have the opportunity of showing their horses to the Army buyers at convenient centres.

Vested interests unless they are pliable and helpful only hinder the wheels of progress, and the whole question of horse-breeding needs looking at solely from the point of view of producing an adequate and efficient supply of military horses. Horse-breeding must be better organized in order to get better results. We can show quite as good a record in organization in some directions as the Germans, and we do it with a better spirit. In agricultural matters, however, buying and selling have never been done on a true and wide co-operative basis, and whilst many other industries have been highly organized and benefited proportionately agriculture, and horse-breeding, which is an important branch in connection with it, have only been conducted on primitive principles. The State can help this process of organization. It can lead and advise, and it is up to it to see that this country becomes more independent as regards horse production and achieves therein a sounder place in peace and a safer place in war.

A Committee has recently been appointed by the Earl of Selborne to go into the question of the light horse supply for military purposes. Let us hope that in any conclusions the Committee comes to and in any measures it advocates it will be supported as an essential and vital factor in the success of its contemplated procedure by the well-filled purse, which means a liberal and sufficient sum of money from the Treasury.

MILK FEVER IN COWS.

BY PATRICK MACCORMACK, M.R.C.V.S.

UNDER the above heading I have just read the short article by Mr. G. Mayall in THE VETERINARY JOURNAL with great interest. Perhaps his was an exceptionally tedious case, as it appears to have taken up a considerable amount of his time, and necessitated the administration of a number of costly drugs. I have a very great number of these cases annually, and so far have lost very, very few. For the benefit of those whom it may interest I have pleasure in stating the measures I adopt, and which have met with unqualified success.

On being called to the case the usual history is given to me, *i.e.*, cow in good condition (not necessarily), second or third calf (though I have had typical cases in old cows). Calved and cleaned all right, but for some unaccountable reason went down within twenty-four hours of the act of parturition. Rumination has ceased, probably also milk secretion. The head is poked straight forward, or else is held round against the side. More often than not a heavy moan accompanies those symptoms. A dull semi-comatose condition may also appear, or if the animal has been bad long very violent symptoms may be present. Urination and defecation seem to have ceased.

I immediately procure two bags packed well with hay, get the cow put up as straight as possible on her brisket, and place one of the bags under her shoulder and the other under the side and hip on the side on which she is lying, giving orders at the same time, should the beast go over to the other side the bags were to be changed also and placed as before. I think this keeping of the animal up on its breast for a few hours very essential to successful treatment.

Whether the semi-comatose condition has appeared, or otherwise, I immediately give hypodermically one of Parke Davis's "cardiac tonics." Should the violent stage be apparent, I give chloral hydras, pot. brom. $\bar{a}\bar{a}$ $\bar{f}\bar{i}$ in a quart of new milk. I then set about passing a catheter to draw off the urine, back-rake the rectum, and finally, after having previously drawn off any milk that may have been in the udder, inject sterilized air till each quarter appears well filled to the eye, and by tapping with the finger. Having tied the teats with fairly wide tape and

given instructions not to remove them for four hours, I impress upon my client the necessity of keeping the cow in the upright position for that period if necessary.

As a general rule, by the time this much is done the animal presents a much livelier appearance. I refrain from prophesying what time the animal will get up, but find from experience, and on subsequent inquiry, they usually do so in about four hours.

Should I note a tendency to dryness or hardness of fæces on back-raking, I give a pound of Epsom salts in two pounds of treacle to which some warm water has been added to thin it. This accompanied by a few quarts of warm water enemata has the desired effect of either curing or stalling off dry murrain.

[The importance of keeping a cow on her brisket is recognized by all cattle practitioners. It is one of those things we learn as pupils. The objection to the air treatment is that any layman can adopt it. The point *re* costly drugs used by Mr. Mayall in his treatment has not much force when we find Mr. MacCormack using such drugs as pure digitalin, sparteine sulphate, and strychnine nitrate (Parke Davis's cardiacs), besides, chloral hydrate is now 17s. a lb., and pot. brom. 18s. Mr. MacCormack, too, is apparently greatly favoured if all his cases of milk fever are simple, uncomplicated ones. Salts are often administered by the owners some time before a veterinary surgeon is called in. The reason for keeping the tapes on the teats for four hours is not apparent. Why not twelve? In the majority of our cases milk secretion does not appear to have ceased, because the bag is stripped each time it is injected.—ED.]

PARASITES AND THEIR POISONS.

By F. G. MAHON, M.R.C.V.S.

Southampton

For many years the study of helminthology has been one to conjure with, so as an old student of the same, although I was first introduced to the same study whilst acting as monitor to the late Dr. T. S. Cobbold, for many years Great Britain's foremost author, writer, and teacher of the same—yes, even as far remote as 1883—and wherever and whenever opportunity in practice has occurred the subject of parasitism has been one of

extreme fascination. In having the sole charge of a large veterinary practice during the present war, *i.e.*, filling the gap for one called, and worthily so, to the honoured Army Veterinary Corps, may I be permitted to engage my readers for a few moments in endeavouring to express a few of many views on the subject. To do so is to find myself in agreement without any cavil with the extract which I give, culled from *Knowledge*, October, 1915, recording the following from that able writer and authority on zoology, &c., viz., Professor J. Arthur Thomson, M.A., LL.D.

“*Parasites and their Poisons.*—We have referred to the fact that a vigorous animal may harbour numerous parasites without seeming to be the bit the worse. But a delicate or enfeebled animal may be killed by them, and lack of vigour, or something unwholesome in the diet, may lead to an increase in the number of parasites. It has been known that ‘intestinal worms’ sometimes cause nervous troubles.”

This was formerly attributed to the irritation of the nerve endings on the wall of the intestine, but it is now referred to the toxins which the parasites produce. Extracts of flat-worms may serve to bring on the nervous troubles if injected into the subject.

In working with these Dr. Demetree E. Paullian found that his fingers, nose, and eyes were affected. This indicates that they are volatile, and that the poisons can pass through the skin.

Reviewing these facts one cannot but express grave doubts as to the utility or rational treatment so called, hitherto in vogue. The old-fashioned, much-vaunted specifics which each practitioner hugs and cherishes in the fond belief that in its secrecy, because the majority I have encountered think, as a rule, their treatment only, and theirs only to be the best.

I have employed practically nearly every known drug of the East and Western Hemispheres, at times have tried the remedies of scores of practitioners, but as regards the efficacy of both the allopathic and homœopathic drug employment, have for years been sceptical of their efficacy, and feel sure, in many cases, the host has been materially injured constitutionally by their employment if continued over a long period.

Recently I have come across many cases of *Tænidæ* and *Ascaridæ* in the horse, dog and cat, and strange to relate, I have discarded all known anthelmintics or agents which expel worms.

so-called, and adopted antiseptic treatment, first of all building up my patients by good nourishing food, exercise in moderation, and in the horse, as a beast of burden, conserving his powers by advising less hard work than formerly and more creature comforts. This *régime* of diet, rest, and work has been followed by excellent results from a mixture of beta-naphthol and salol. Carbolic acid and glycerine has also been tried with excellent results, as has also formidine. Now all these agents are antiseptic, and if placed in a media of glycerine apparently move in the right direction, and so far as I have been, in a busy practice, able to record, my patients have in all cases done well. Surely, in view of Professor Thomson's record of Dr. Demettré E. Paullian's researches, a move in a more practical sensible light is indeed needed.

Progress in many directions of veterinary science does not seem, to my way of thinking, to have made strides in many directions since 1885, and to read the literature or records of the agents used by veterinarians in the treatment of parasitic diseases seems to be one at variance with the savants quoted and to be inimical or destructive to animal life in many cases. My intention is to pursue tonic treatment primarily; secondly, antiseptic treatment in the future, and hope at some future date to tabulate, so far as my humble abilities and pen will allow, cases treated by these means.

May I ask my readers not to be over-critical when perusing these few lines on a most worthy subject, viz., helminthology, so interesting and material both to the human and veterinary practitioner, also as regards our food supply and the dangers to the host very often when infested by these creatures (parasites), whose rôle in Nature is no doubt a great and useful one, otherwise we should not have such among us so often, or in such numbers, and evidently part and parcel of the Supreme Mind who fashioned them, as well as ourselves, for good or evil purposes.

SOME IMPORTANT CATTLE DISEASES IN NORTH-WEST RHODESIA NOT MENTIONED IN THE TEXT-BOOKS.

By J. MALCOLM ARMFIELD.

G. V. O., Lusaka, N. Rhodesia.

I WAS interested in reading Mr. W. Kennedy's account of three-days' sickness in East Africa, appearing in the March edition of this Journal.

Last rainy season (from November, 1914, to March, 1915) I had the opportunity of observing a large number of cases of this disease and found the symptoms similar to those in the above-mentioned article. But I also observed on many farms a sort of prolonged "three-days' sickness" which accounted in many instances for a high mortality. Instead of the usual rapid recovery, the animals remained with a stiff gait in the hind limbs for many weeks and showed emaciation. I may mention that the rains were unusually heavy last season. Another disease which has caused great havoc amongst bulls imported from England into this country is the so-called "posterior paralysis." This appears to be a new ailment, observed for the first time during the last two years in this country.

At present, although a considerable amount of work has been done on it, practically nothing definite has been discovered.

The Cause.—At first the inoculations for gall sickness and red-water carried out by the Veterinary Department were blamed by the farmers. There does not appear to be any foundation for this suspicion, as recently I have observed several typical cases in animals which were not inoculated for the diseases just mentioned. Experiments in which it was tried to infect healthy animals by transmission of blood from infected ones have failed.

Sarcosporidia.—These organisms were discovered in the muscles of the thigh of affected animals, but similar organisms were also found in old animals not suffering from "posterior paralysis." *En passant*, sarcosporidia were suspected by some high authorities to be the causal agents of a similar disease, namely, lamziekte, in the Union. But Theiler refuted the idea. No specific bacterium has been isolated.

Possible causes may be poisonous plants, change of diet, change into a semi-tropical climate. These matters have not been fully investigated up to the present.

Symptoms.—The disease may take an acute or a chronic

course. Several recoveries have occurred, but the majority of cases terminated fatally. I have seen two cases where death occurred three weeks after the onset of symptoms. The animal is first noticed to be walking lame behind and "a knuckling over" at one or both fetlocks. This lameness gradually increases and soon the subject is found down in his stall able to rise only with difficulty. He usually gets up horse fashion (the forelegs first). As time goes on he cannot rise without assistance and finally is unable to get up at all. All this time his appetite and general health remain practically normal. Urination and defæcation are performed with ease—thus it would seem that the abnormality of the nervous system occurs behind the lumbo-sacral plexus. I have found the temperatures raised 2 to 3 degrees at the beginning of an attack, while when death is approaching the temperature has been subnormal. (In a semi-tropical climate it is difficult to arrive at much information from the thermometer.) In the last stages the animal becomes emaciated and covered with bed sores.

Occurrence.—Thoroughbred bulls imported from England. Half-bred stock (home stock crossed with native stock) native cattle. Up till quite recently we considered "posterior paralysis" as only affecting imported stock, but in the last few months apparently identical cases have been observed in pure native cattle.

I have not had the opportunity of studying lamziekte, but several farmers who have seen both diseases inform me that they are unable to see any difference between lamziekte of the Union and "posterior paralysis" of Rhodesia, but Theiler declares they are two different diseases, although the causal agent has not been discovered in either case. It is as well to be optimistic, and naturally one hopes to live to see some of these mysteries cleared up, but one cannot help remembering that one of the most common diseases in cattle at home, also a paralysis, namely, milk fever, has not, after all these years, had a specific cause allotted to it.

It is worth considering if there is any connection between three-days' sickness, prolonged three-days' sickness, posterior paralysis, and lamziekte. They all seem to be cases of spinal paralysis, but the greatest similarity lies in the paucity of one's knowledge concerning them all.

FLY PREVENTION MEASURES.

BY A SANITARY OFFICER, BRITISH EXPEDITIONARY FORCE.

A SHORT account of the measures undertaken for the reduction of *Musca domestica* in manure heaps, in camps and in billets in military areas, is thought to be useful at such a time. Details are given, for attention to what appear to be minutiae is the secret of success.

To describe the life-history of the house-fly would be imposing on one's readers, and only special points elucidating processes undertaken with a view to fly reduction will be referred to.

MANURE HEAPS.

Adult pregnant flies lay their eggs in clusters; the clustering is readily recognized, and occurs in fresh manure as a rule, but will also occur in stale manure freshly turned over. The clusters occur in cracks in the manure and consist of hundreds of flies, sometimes so many that on more than one occasion flies have been seen leaving a cluster (having laid eggs), carrying one or more eggs on their backs, which have been deposited there by mistake. Clustering is always to be found in a sheltered spot, preferably facing the sun and in places which have been trodden on. Where flies are seen clustering they are not disturbed, but clusters are marked with a stick, and when completed the eggs are lifted and burnt. A trained man removes thirty to forty batches of eggs in a day, which practically means dealing with the egg supply of the day. These eggs have to be removed the day of laying, as in summer time the eggs hatch out in a few hours (four to eight).

The manure brought down from stables has been exposed to flies and contains eggs and larvæ; these cannot be recovered. Passing from the egg to the larval stage, for the purposes of this paper the larval instars will be dealt with as consisting of two only: the first the feeding larvæ, the second the larvæ about to transform into the pupæ. This division is made owing to the different habits of the two stages.

The first stage is passed in the manure on which it feeds. Owing to fermentation and the heat arising therefrom it is only the upper two or three inches of manure which are suitable for feeding larvæ. A study of this stage of the insect shows that

it does not migrate to any extent; as eggs are laid in clusters so the feeding larvæ are to be found in accumulations known as nests. Where feeding larvæ exist in large numbers the manure is absolutely trituated, and search for these larvæ is facilitated by recognizing these trituated places.

During this, the feeding stage, there is no known method of trapping owing to the fact that in horse manure is the natural food supply. On completion of feeding the larva ceases to grow and then it begins its second stage. This is the true migratory life, when its object in life is to find a suitable place in which the pupal stage can be passed. Manure is no longer suitable unless it has ceased fermenting. The larval movements have been studied and are found to be carried out at night and on the surface. This is the creamy stage, so-called owing to the colour, the larva having voided the contents of its intestinal tract. Food no longer being necessary the larvæ are seen on the surface of manure, making, apparently by instinct, for a suitable site. This must be such as to retain sufficient moisture to keep the pupæ from being desiccated, and it must be comparatively cool. Such a site is to be found in the earth on which the mound is placed, or in any hay or straw lying on the surface and which is not fermenting, or else in the old cold portions of the manure heap. Pupæ are to be found in such places in enormous numbers. Incidentally it may here be stated that in the natural traps many pupæ are killed off by a fungus, presumably the *Empusa muscæ domesticæ*. With this knowledge Nature has been imitated and traps are placed to catch larvæ in the "creamy" stage.

The following is a description of the trap and the manner in which it is used.

Square ration tins are used; these have slits made in all four sides at a level of about 2 in. from the bottom; these slits are kept open by means of a pebble placed inside so that the upper edge overhangs the lower. The tins are then filled with about 4 in. of sand or chaff, and are then embedded in the manure so that the slits are on a level with the surface of the manure. On wet nights the tops of these tins have to be covered over. In one such trap over 5,000 larvæ have been caught in a night.

METHOD OF LAYING TRAPS.

It is understood that the manure is dumped at a heap. The face which is not being dumped against must be well trimmed

off and a drain channel cut along its face: the earth from this drain must be thrown away from the heap and not on to it. Traps are placed along the edges of the mound at about an interval of 3 to 4 ft. As the heap is added to the line of traps is advanced so as to keep the old manure isolated from the fresh. Where this method is taken into use on an old mound, the line at which the traps should be placed is worked out as follows: Starting from the fresh manure, this is turned over to find feeding larvæ, similarly the old manure is searched for pupæ. This portion of the heap has to be shut off from the fresh manure, so that the traps have to be put as close to the fresh manure as possible, at a point well within the places where the pupæ are to be found. By the use of these traps a heap can be kept free of creamy stage larvæ. The chaff with larvæ are burnt daily.

Dealing with the adult flies on manure heaps, formalin solution is used. The strength of this solution is 1 in 40 of the 40 per cent. solution, to which is added "ghurr," a native raw sugar ration, somewhat similar to molasses. The solution is placed on the heaps in inverted tins, with pieces of bread soaked in it. These traps work excellently on calm dry days and are not of much use in wet weather. The reason for this is due to the anatomy of the mouth-parts of the house-fly, which is such that all food has to be sucked up through a tube in the form of a solution. Water, therefore, is essential to the life of the house-fly, and the drier the surroundings the better the result from the formalin. On windy days the tins must be placed in sheltered positions at the sides of manure heaps.

On wet cold days the insect is too numbed to fly and crawls about on the surface of the manure, from which it apparently gets both its moisture and nourishment. What the food is cannot be stated, as sugars are said not to be found in horse-dung.

The supervision of the above-mentioned operations can be carried out by one man, and the following brief recapitulation gives an idea of results obtained:—

(1) *Marking clusters and removing eggs.*—Maximum number destroyed in a day forty clusters, estimated number of eggs per cluster 2,000; total, 80,000 eggs destroyed per day.

(2) *Larvæ Traps.*—Sixty traps, maximum count for one trap over 5,000, average estimate per trap 2,500; equals total 150,000 larvæ caught per day.

(3) *Formalin Traps for Flies.*—Sixty traps, a rough estimate for flies feeding off each trap 100; a total of 6,000 flies killed daily.

From the above it is seen that about 236,000 of all stages are destroyed per day; roughly put, a quarter of a million are got rid of by the exertions of one trained man. When a manure heap is dead the sides are sown with oat and hay seeds, the top being planted with marrows and flower seeds obtained as a gift from Messrs. Carter and Sons. Incineration of manure is being carried out with results at another unit.

The incinerators used are locally known as "bedsteads." Large-meshed wire netting, as used for reinforcing concrete, is placed on iron bars supported on cresol drums. Simplicity and ease in erecting are aimed at.

In the incineration of manure two main difficulties have to be surmounted, the one the removal of ash and the other the prevention of condensation of moisture; both are overcome by using this type of incinerator. The incinerators are put up on top of the manure heap, where they are exposed to the wind; they are arranged in a circle, the inner side of which has a narrow gauge tram-line, which is the means by which the manure is brought from the stables down to the dump to feed the incinerators. The bedsteads are covered with the drier portions of litter, and manure placed on top; fires are started with old sacks placed in paraffin, which are applied to the face or faces exposed to the wind, and a ridge of burning manure is thus obtained. Once the fires are started the incinerators should be loaded up to a depth of 2 to 2½ ft. The side of the incinerator away from the wind has a piece of corrugated iron put against it to cause the air current to pass up through the burning manure.

Ashes are removed from the fire by hitting the under-surface of the incinerator, they are then raked away and thrown on the side of the mound.

The condensation of moisture is avoided by not loading to a greater height than that already indicated, otherwise the upper layers of manure will be rendered sodden. Once an incinerator is burning well, it is found to burn through in different parts; these holes have to be filled in, otherwise the fire burns out. A fire once started can go on indefinitely. With this method the chief objections are the amount of labour required and the

material for bedsteads. As with other manure heaps, the number of adult flies is kept down by the $2\frac{1}{2}$ per cent. formalin traps.

METHODS EMPLOYED IN CAMPS AND BILLETS.

Here the only stage which has to be dealt with is the adult fly. Breeding does not occur owing to the fact that all refuse and excreta are removed and burned daily.

Methods used generally in camps consist in attention being given to the following:—

Kitchens.—Wire gauze is applied to all windows; this is not done to doors, so that cook-houses are in nowise fly-proof. Where flies are a nuisance the use of chicks to windows and doors reduces them enormously and is much better than wire gauze, as flies object to darkness. All cook-houses and dining-rooms are furnished with balloon wire fly-traps, baited with jam or sugar in solution. The best bait is stale beer and sugar; and a bait which is now being tried is equal parts of cheese and sugar made into a paste with water.

Plates with the formalin solution are placed on brackets and each has a piece of bread placed in it.

Fly sticky papers are not issued, and a formula for making this mixture was obtained from Lieutenant R. R. Newstead, of the Entomological Commission, and is as follows:—

Five parts of castor oil and eight parts of resin, the mixture being well boiled. This is issued either spread on paper or in tins, and the units see to the spreading.

Cook-houses are sprayed out weekly with 2 oz. to the gallon formalin solution, and in those billets where flies are numerous spraying is carried out two or three times a week and sprayed at night.

For this work fly brigades have been at work, consisting of an N.C.O. and four men, and the work required of them is seen from the form which is shown.

No fly counts are made, and the expressions “Numerous” or “Not numerous” are the indications as to whether a billet requires more than the usual spraying.

The remaining places where precautions are taken are meat stores, food stores, dining-rooms, latrines, and incinerators. All these places have the formalin solution placed in them.

Protection of foodstuffs is carried out as thoroughly as possible, but as this paper is an account of measures taken for the reduction of the house-fly, this subject will not be further referred to.

UNIT.....

FOR MONTH OF.....

ADDRESS.....

COMPILED BY.....

1 Date of inspection	2 Condition of meat-safe : scrubbed, clean, food only	3 State of kitchen : if clear of clothing or boxes	4 Position of meat-safe : in passage, out of sun
5 Number of plates containing formalin, and position	6 Number of windows and panes	7 Size of panes (exactly)	8 Wall-paper, walls. or white-washed
9 Refuse-bins : number and if properly covered	10 If refuse-bins are smeared inside of lids	11 If sufficient provision for covering <i>all</i> foodstuffs	12 If drain gully is cleaned and paraffined
13 Windows and doors paraffined	14 Number of flies in cookhouse : numerous or not	15 Type and state of latrines	16 Number of flies in latrines : numerous or not

CONCLUSIONS ON BURSATI.

BY THE LATE LIEUT.-COL. J. D. E. HOLMES, C.I.E., M.A., D.Sc., M.R.C.V.S.

(1) A CONSIDERABLE amount of confusion exists in literature regarding the identity of bursati in India with "leeches" in America, "swamp cancer" in Australia, and other affections described as "summer sore," "granular dermatitis," and "parasitic fibromata," &c.



Bursati of fetlock and pastern. Sore circular in contour, in centre dry granulations, callous edges of skin.

(2) The latter affections, such as "summer sore," "granular dermatitis," and "parasitic fibromata," &c., are held, on the observations of several authors, to be connected with the presence of nematode embryos.

(3) Bursati varies in most clinical aspects from the affections described as "summer sore," "granular dermatitis," and "parasitic fibromata," &c.

(4) There is not sufficient evidence to prove that nematode embryos are present in bursati lesions, or that the bursati sores or tumours are caused by such embryos.

(5) There is a similarity in several clinical aspects between "leeches" and bursati.

The presence of a fungus in "leeches" has been recorded by several observers and described as causal agent. The spores and mycelia of a somewhat similar fungus are frequently to be found in the kunkur and tumours of bursati.

(6) The presence of spores and mycelia in the bursati tumours, and the fact that cultures of a fungus of the genus *Sporotricum* have repeatedly been obtained from bursati tumours and kunkurs and also direct from the blood of horses infected with bursati,



Atypical form of bursati, causing a diffuse erosion of the skin.

affords some evidence that the disease is a mycosis somewhat resembling the sporotrichosis of the horse and mule described by Carougeau in Madagascar.

General attention to the health of patients under treatment is advisable, and although I am unaware of recorded cases of transmission of the sore from horse to horse by means of outside agencies, it is well to isolate cases and to treat each as a potential source of danger to others. Recently encouraging results are following the administration of arsenious acid to cases under treatment in doses of increasing strength and for periods up to a month.—*Memoirs of Dept. of Agric., India.*

ARGUMENTS IN FAVOUR OF THE THEORY THAT
PLANTS CONTAINING OXALIC ACID ARE THE
CAUSE OF HÆMATURIA IN CATTLE.

THE cause of hæmaturia has long been looked for in vain; many theories have been advanced and refuted, so that it is natural for me to be conservative in what I am about to say, and in interpreting the results of the experiments I have lately been conducting. Before going any further, I should like to mention the valuable help given to me by Dr. W. E. Dixon, the noted toxicologist of Cambridge University; he it was who helped me to formulate the ideas I now hold on the subject.

These experiments, to my mind, are very encouraging, and my field observations back them up, so that I feel much more satisfied concerning the outlook of controlling hæmaturia than I ever did before. Experiments were undertaken to prove that oxalic acid in plants played an important part in producing hæmaturia in cattle. The experiments were divided under two heads; one the injection of calcium oxalate crystals into the bladder, the other the feeding of oxalic acid by the mouth.

In experimental injections into the bladder of calcium oxalate crystals the animals evinced great irritation, and, after several injections, made on consecutive days, straining became more marked, and finally bloody urine was passed. This proves conclusively that calcium oxalate crystals can wound the walls of the bladder sufficiently to cause hæmorrhage. These experiments have been made with four different animals.

Calcium oxalate crystals have been demonstrated in many cases of hæmaturia in this country, and I found them also in a specimen I brought back with me from France. Their numbers are often small, but I have already shown that the disease takes, on an average, six years to develop; thus it is probable that the constant irritation of these crystals, even when present in small numbers, may eventually produce hæmaturia. Nearly all the experimenters who have worked on hæmaturia say that the bladder lesions are undoubtedly the result of prolonged irritation. An interesting point which I have not seen mentioned is the fact that the majority of the lesions found in the bladder are in the most dependent parts; this likewise suggests that the irritant falls to the lowest parts of the organ in the same way that calcium oxalate crystals fall to the bottom of a beaker.

The results of feeding oxalic acid by the mouth have not been as satisfactory in producing hæmaturia as the foregoing method of injecting crystals into the bladder. Oxalic acid is toxic for the first few doses, but very soon the animals develop a toleration for the drug and can take very large doses. The effects on the urine are apparent from the first. Albumin is seen, and epithelial cells become numerous after sedimentation. Red blood corpuscles also appear in smaller numbers; in some cases they are in sufficient quantities to be visible to the naked eye. Calcium oxalate crystals are numerous. Three calves and a cow were experimented on. It is a fact that, under natural conditions, young animals under 2 years of age rarely contract the disease. In my own experience I have never seen such a case, but have heard of one or two at 18 months. This age limit supports my theory, because young animals which drink milk are not affected. At first they do not take green food at all; later when they begin to do so, the lime which is in the milk would be sufficient to cause the oxalic acid in the plant to be turned into calcium oxalate and eliminate it as such in the fæces. It is possible that the hydrochloric acid which is present in the digestive juices may be strong enough to act on some of the oxalates found in the plants, converting these into oxalic acid. If this is so, the lime would neutralize this effect. No experiments have been made to prove or disprove this point.

In the experiments I have been conducting of giving oxalic acid by the mouth a large percentage of it must be eliminated in this way; but, when there is too much for the lime in the food to act on, a certain amount of the free acid must be absorbed; hence the crystals are probably formed somewhere in the urinary tract, when the acid comes in contact with the mucous or other fluids which turn it into calcium oxalate. Arguing from this point, one would expect to find that animals which are given oxalic acid would be stunted and not grow like other animals. This is undoubtedly the case; the animals one finds in the red water districts, if born and raised there, are usually undersized. Experimentally, I have proved this in the case of two young bulls.

In treating cases of hæmaturia I have found that lime salts, such as calcium chloride, calcium lactate, and ordinary lime, help animals. In several cases I have seen the blood-clotting properties raised. These drugs at one time were largely used in

cases of hæmophilia, but now are not held in much esteem. It may be that the improvement I noticed was in reality produced by the action of calcium on the oxalic acid, as it is well known that oxalic acid retards the coagulation of blood. Medical men have long known that acid fruits and vegetables are harmful to some people, and there is much literature on the subject.* I have heard of cases where the ingestion of rhubarb caused smarting and burning after urination, and occasionally red cells were found on sedimenting the urine. In cases of oxalic acid poisoning in man, hæmaturia has been seen and bleeding along the alimentary tract. During the course of my experiments I have observed the irritating nature of the crystals, and have seen blood-stained saliva coming from the mouth, and bloody fæces. These are the main facts I have learned from my experiment; in the field, my observations also lend support to them. On this very farm twenty years ago there used to be many cases of hæmaturia. The land was then newly cleared, and I am told that all the fields were very sour; it is now fourteen years since there has been a case. I could mention very many cases of this sort. Hæmaturia is undoubtedly a poor man's disease, and occurs in new districts. I have seen the disease leave a farm in two or three years, notwithstanding the fact that the descendants of the original cattle remained on it. This disappearance followed clearing operations and cultivation. On other farms, where the disease is more or less permanent, one finds that the cattle are still allowed to roam at large in the woods or in partially cleared lands; but, as soon as the owner keeps his animals under fence, cultivates his land and feeds them better, the disease vanishes.

A curious and very important fact, which is well known to the farmers of this province, is the absence of hæmaturia on the delta lands at the mouth of the Fraser river. The reason for this is obvious; the land forming this delta came from the uplands of British Columbia, which are of a totally different character; no cases of hæmaturia are to be found on the inland plateaus. I am told by horticulturists that on the delta the wood of the trees resembles that found in the interior of the country, and, certainly from an agricultural point of view, the land is of the very best. There are other river deltas that I know of where

* A very complete list of references on Oxaluria may be found in Noordens' "Metabolism and Practical Medicine," vol. iii, pp. 1053-1054.

one finds an odd case of hæmaturia, but in these cases the source of these rivers was in the coast belt.

One other point I desire to make is that the disease is to be found in many widely separated countries—the Pacific Islands (Case), Australia (Cleland), America, France, Belgium, &c., and in these different countries the vegetation varies tremendously. Plants containing oxalic acid, however, have a world-wide distribution, which bears out my contention that if the vegetation is the cause of hæmaturia, it is not confined to one species of plant.

Many investigators have claimed that hæmaturia was a contagious disease—Detroye, Moussu, Bowhill, and Kalkus.

During the past two years I have experimented on seventeen animals, and have tried to infect them in a variety of ways—by cohabitation, by injecting urine into the bladder, by giving it by the mouth, by the injection under the skin of blood and urine—but without success. From this and other observations in the field, which I have already recorded, I consider the matter settled. I will finish this part of my report by quoting from Moussu's excellent article on the disease. Several references are made to other workers; some of their conclusions are similar to mine, except that they do not go as far. For instance, Pinchon believed its appearance was due to changes in cultivation (clearing), which in 1830 and 1860 completely altered the general appearance of the country. Sinoir had much the same ideas; Boudeaud and Cruzel thought the disease was due to poor feeding. This idea, though quite wrong, owing to the fact that animals may starve to death without showing signs of hæmaturia, backs up my statement that as a rule the diseased animals are poor specimens of their respective breeds. I do not mean that all cases are thin, but they are generally rough animals, receiving little care and attention. In talking over the benefits derived from cultivation with Mr. Moore, superintendent of this farm, he gave me an idea which I believe is correct. He says that cultivation and reseeded meadows may not check the acidity of the soil, but that it will tend to crowd out the acid plants, and that when liming is practised it tends to encourage lime-loving plants, which also displace the acid ones.

In speaking on treatment, Moussu recommends improved farming methods, such as the cultivation of pasture fields and the application of superphosphate of lime in particular. He says that Boudeaud has seen the disease disappear when these improvements had been put into practice on farms where the disease had been in permanent possession.—*From Report of Veterinary Director-General, Canada.*

Clinical Articles.

FRACTURE OF THE INFERIOR MAXILLA.

By HENRY TAYLOR, F.R.C.V.S.

Haywards Heath, Sussex.

Case 1.—The subject was a pony 15 years old, and the fracture occurred through the animal in laying hold of the manger with his teeth getting the jaws firmly fixed open and suddenly wrenching himself free. Three teeth of one side were protruding, and the inferior maxilla split longitudinally about the symphysis and also at the neck. The teeth after some trouble were got back into their normal position and kept in place by means of first, a piece of tape, and second, a bit of copper wire wound round the whole of the incisors. Some spicules of bone were taken out of the gum later on. The pony in about five weeks made a perfect recovery, and one could not see eventually that anything had been the matter.

Case 2.—This animal was an old mare about 20 years old, and the cause in this case was a kick from a colt turned out in a field. The fracture again occurred at the symphysis and neck. Treatment was on similar lines to the other, and again a perfect recovery ensued notwithstanding the advanced age.

Remarks.—In both cases, luckily, fracture was confined to one branch of the lower jaw, so the treatment was no difficult matter. In each instance the wounds in the interdental space and at the symphysis became offensive through particles of food lodging therein.

EPITHELIOMA OF THE PENIS IN A PONY.

By J. F. D. TUTT, M.R.C.V.S., F.R.M.S.

Winchester.

THE subject was an aged pony used for occasional short journeys into town.

History.—The owner came to me on September 3 last and asked me to come and see his pony, because it had great difficulty in urinating, and its sheath was very much swollen. As

a result of this the pony was rapidly losing condition, and as he was an old favourite he desired to have it remedied if possible.

On arrival at the stable I examined the sheath and endeavoured to withdraw the penis, but was unable to do so on account of the swelling. I was, however, able to feel that the top of the penis was rough and that a growth was present. I advised operation, and this was readily acceded to.

I accordingly operated on September 7. The animal was cast and given a general anæsthetic. When well under the influence of the anæsthetic I endeavoured to withdraw the penis, but had the greatest difficulty in doing so, and eventually, when I had secured it, I found that the end of the penis was covered with cauliflower-like excrescences, and for a length of five inches was greatly enlarged and hardened.

The urethral opening was practically obliterated and it was quite impossible to insert a catheter, even when the opening was slit up for three or four inches.

The healthy portion of the penis was secured by a piece of wide tape, and the ends were held by an assistant.

The diseased portion was then carefully removed and the slit portions of the urethra were sutured to the end of the stump in such a manner as to diminish the risk of stricture. The pony made a good recovery and at the date of writing is doing well and is able to urinate quite freely. Owing, however, to the nature of the growth, I am afraid that the cure will only be a temporary one. The owner informed me that the pony did have some "warts" removed from the end of the penis some two years ago, but that for eighteen months previous to my seeing him he had never noticed him "draw" when urinating.

MICROSCOPICAL EXAMINATION OF GROWTH.

A paraffin section was cut and suitably stained. The penis was seen to be infiltrated by an extensive malignant growth having the structure of a squamous epithelioma. It was composed of ingrowing epithelial columns with cell-nests and keratinoid changes, exactly like the same growth in man.

CHLOROFORM ANÆSTHESIA: AN UNUSUAL
SEQUEL.

By HENRY TAYLOR, F.R.C.V.S.

Haywards Heath, Sussex.

THE subject was a Clumber spaniel bitch, about 5 years old, which the owner had brought from British Columbia and which was being detained here in quarantine under the Board of Agriculture regulations for imported dogs. The owner told me that there had been cases of rabies in that country, but that he did not think the dog had been exposed to infection from that disease. The bitch had one of the usual kind of mammary tumours, about the size of a tangerine orange, which the owner requested me to remove, and for which the Board granted permission after some weeks' detention, and it was during the operation that the fatality happened.

The animal was placed on the operating table, but before beginning the administration of the chloroform the dog was muzzled by a piece of tape, as we did not want to run the risk of getting bitten by a dog to which even the very slightest suspicion of rabies was attached. My man acted as anæsthetist, and he is quite experienced in the administration of chloroform. The method of administering it was by means of a sleeve of thin calico into one end of which the dog's head was inserted, the orifice at the other end being adjusted to regulate the amount of air, and just inside it was placed a sponge wetted with the anæsthetic.

The dog took the chloroform rather badly and slobbered a good deal, but at length she seemed under and the operation was just being commenced when my man remarked that she seemed full of wind. The abdomen was apparently tympanitic and the animal seemed to be labouring in her breathing, so the administration of the chloroform was discontinued, the muzzle removed, and the operation rapidly performed. On being brought into the fresh air the patient came to, but the abdomen still remained distended with gas, and there remained the laboured state of the breathing. The distension was chiefly in the flanks, but the skin was not so tense as to suggest tapping with a trocar and cannula. The animal looked haggard and frequently tried to be sick, though at each attempt nothing was ejected, absolutely nothing. Carminatives along with spiritus etheris nitrosi were administered

at intervals with no alteration of the symptoms, and the patient died during the night.

Next morning a *post-mortem* examination was made. On cutting into the abdomen the first thing which attracted attention was the stomach, which was enormously distended with air or gas; it was so large that it resembled a football and, of course, it extended posteriorly from under the ribs to the flanks. Its walls were thin, and on pricking it collapsed in a manner which suggested that its muscular elasticity was wanting. The gas had no odour except from the medicines administered, and the organ was empty except for a few drops of liquid. The intestines had the blood-vessels of the venous system congested, but they contained no gas or air.

The cause of death was clearly due to the extreme distension of the stomach with consequent interference with respiration and the circulation of blood. It is curious that the dog did not expel the air from the organ during the frequent attempts to vomit; the explanation of that is, to my mind, the fact that the muscular fibres of the organ were in a state of atony. The advent of the air into the stomach no doubt arose from the animal swallowing it during the administration of the chloroform, and it is possible that the excessive slobbering and the muzzle together had something to do with it; at the same time I should not care to neglect any precaution to prevent getting bitten by an animal which even in the remotest degree might be affected with rabies.

Abstracts and Selections.

HOG CHOLERA.

By F. R. COMBER, B.S.A., D.V.M.

Former Assistant State Veterinarian, Wisconsin, Sault Ste. Marie, Mich.

THERE is no more vital question confronting the stock-raiser of to-day than the disease known as hog cholera. Synonyms: peste du porc (French), swine fever, pneumonia enteritis, pig typhoid, Schweinepest (German).

This is an acute febrile disease which, as far as is known, affects only hogs and which is characterized by extreme contagiousness and high death-rate. It is usual to speak of two

This is because of the fact that some cases of the disease is sudden in its onset and rapid in its course, whereas in others the affected hogs linger for weeks or months before death or recovery. The causative agent is the same in both, the difference being the variation in virulence of the germs and the resisting power of the hogs. Enormous losses are caused yearly in the large hog-raising states of the Middle West. Statistics verify the fact that many States lose yearly an average of over \$1,000,000 from this source alone.

The cause of hog cholera is a virus, presumably a germ, according to some authors think it the bacillus cholerasuis found in the blood, urine, and other body fluids and passes through a porcelain filter sufficiently fine to withhold the minutest organisms visible through the most powerful microscope. For practical purposes it may be considered a typical germ disease.

The virus gains entrance to the body through the digestive tract or through the broken skin. Infection through the air passages seldom occurs.

The disease is transmitted by the introduction of the virus either directly by the sick hog or any agent capable of carrying contaminated substances from place to place.

Wet, poorly ventilated pens, or anything that tends to lower the vitality, renders the hog more susceptible to the infection. Young pigs are more susceptible than older ones, especially when in close quarters.

The period of incubation varies with the susceptibility of the animal, the virulence of the germ, and the manner in which the germ gains entrance to the body, and varies from a few days to three weeks.

Symptoms.—In the acute form the animals die very suddenly in a few hours or at most after a few days' sickness.

In the other form (the chronic), the disease runs a longer course.

The pigs fail to come to the trough for feed, refuse to eat, or eat earth or other indigestible substances, have chills and huddle together to keep warm, stand with back arched, hind feet close together, belly tucked in, resent being disturbed, stagger and fall; their muscles and joints are stiff and sore, are constipated, for a few days, they develop profuse diarrhoea which persists until death. Sometimes have a hacking cough and breathe fast as result of changes in lungs. They show a pus-like discharge from

eyes which often gums lids together. Rise in temperature 104° to 109° F.

The chronic form differs from the acute largely in duration of disease. There is more marked evidence of digestive disturbance, for ulcers usually form in the intestines when chronic cholera is present, sometimes in this form the hogs eat fairly well. Young hogs get stunted and emaciated and hair may drop off. Usually there is considerable reddening of the skin on the nose, ears, abdomen, inside of thighs and pubic region; the redness becomes more intense as death approaches.

Treatment.—As soon as cholera is suspected, a competent veterinary should be called to make a positive diagnosis.

Vaccinate all hogs with serum if the disease is in your locality. Disinfect and whitewash pens each week with quick lime or some germicidal agent. Feed laxative diet and pasture hogs some distance from highways and streams.

Quarantine for four weeks all hogs brought to the farm.

Post-mortem changes should be looked for as follows: Frequently the skin and underside of neck becomes dark red. The lymph glands are enlarged, congested, and of a deep red colour. The kidneys are dotted with small pin-pointed blood spots which gives them a turkey egg appearance. In some cases the lining membranes of the abdominal and lung cavities show red spots or blotches, if the disease affects lungs, the organs exhibit changes characteristic of pneumonia and pleurisy.

In chronic cholera intestinal ulcers are usually found, have a dark centre and yellow margin, and raised above the surrounding surface of the intestine. The heart and liver are normal in appearance.

The serum preparation is of such a nature that it should not be undertaken by farmers themselves, but should be under the control of trained men who have had experience in bacteriology and who are familiar with diseases of hogs. For this reason no attempt has been made to describe the details of the serum production.

It should be understood that the vaccination against hog cholera does not cure every case, for no known biological product has this power. Yet the successes obtained demonstrate that it is the only reliable agent to use. Those who are interested in the subject are urged to co-operate with the state authorities who have control of this work and to assist them in their efforts to reduce to the minimum the mortality from this much-dreaded disease. It is only through intelligent co-operation that we can expect to attain a final result which is aimed at in the eradication of hog cholera as a serious menace to the hog-raising industry of the country.—*American Veterinary Review.*

GUNSHOT WOUNDS.

BY PROFESSOR L. A. MERRILLAT.

Chicago.

WE shall not attempt to describe a treatment for all of the various wounds capable of being inflicted by firearms. Their varieties forbid in a short review of wound treatment, and the writer, like probably all American veterinarians, except a few in our Army who saw service in the Philippines, must plead inexperience. As the fund of information in this connection is about to be enlarged by the untold range of experience and observation of our European *confrères* it would be presumptuous for one in my position to venture into this domain at this particular moment.

In peace times veterinarians only rarely encounter wounds made by firearms, and when they are met they are generally from low-power guns or shot-guns. These, of course, inflict wounds of a different character than those of high-pressure rifles used by modern armies, saying nothing of shrapnel, shells, bombs, grenades, &c., included in their ordnance. It is the wounds of these modern arms that interest us most to-day, and as peace may not always be our good fortune it stands us in hand to acquaint ourselves with the present experiences of the able veterinarians of the European armies now in the field. Later, when we shall have the opportunity of reviewing well-arranged reports, I shall attempt to give the readers of this Journal a well-connected description of the treatment of firearm wounds compiled from the experiences of these able and experienced men.

To-day I shall content myself with a few simple recommendations. The old custom of immediately searching for a bullet imbedded in the body has long since been abandoned. It is only the plainly felt subcutaneous bullet that is removed to-day. Those lodged deeper, even though they may have been located by the Röntgen rays, are left strictly alone to become encysted or to form an abscess. In the latter event the bullet is removed when the pus of the well-matured abscess is evacuated. "Do not search for bullets unless they can be clearly felt through the skin, but leave them to the tissues, where they will either be tolerated or expelled by suppuration" (Cadeac). Thus Cadeac in a word says about all there is to be especially said about extraction of

bullets. The track of the bullet is not irrigated, nor is there any effort made to explore its depths. Local antiseptic treatment of the orifice to avert secondary infection is, however, faithfully followed, and the patient is watched continuously for febrile complication and for the abscess that will disclose the location of the bullet. Antitetanic serum is always indicated and should never be omitted in the management of firearm wounds.—*Amer. Journ. of Vet. Med.*

War Notes.

THE CAPTURE OF A GERMAN SHIP.

BY A VETERINARY OFFICER *

THE outbreak of this War found many of us in curious places and outlandish spots, but to few of us was given the unique experience of being a passenger aboard a German ship on the day that war was declared. Such, however, was my good fortune, and the narrative may possibly be interesting to readers of THE VETERINARY JOURNAL. On August 1 the outlook was very black. Austria had declared war on Serbia, and Germany had sent an ultimatum to Russia, but it was thought by some that England would be able to keep out of the trouble. Previous to this I had made arrangements to visit British North Borneo and inspect the Government herds, and as I held, amongst other appointments, that of veterinary surgeon to the Military Forces, I had received permission to proceed on short leave for this purpose. I asked at headquarters if it was advisable to make my visit, but the answer was vague and I decided to risk it, and as events turned out I cannot say that I regret it. I lost two months of active service, but believe I was of more use to the country in the East than I could have been with the Army.

On August 3 we left Singapore on the N.D.L. ship *Sandakan*, commanded by Captain Mullinan, an officer of the

* For his prompt tact and pluck in this affair this officer has been awarded the Freedom of the City of London and a substantial portion of the prize money.

German Naval Reserve. There seemed to have been a lot of bustle at the agent's office, and I felt as though events would move swiftly within the next few days.

We were under way by 4 p.m., and at 9 or 10 p.m. the engines were stopped and we came to anchor. I asked the captain his reasons and he told me that a tug would come off at night with orders. The next morning when I awoke we were well out to sea, but stopped again at breakfast time. We then sent off a row boat to another N.D.L. ship which was proceeding to Singapore. This vessel had been given orders to proceed to a neutral port, and we continued our journey. This, of course, indicates that all the German ships' captains were aware on August 3 that Germany was going to war with Great Britain. On August 5 we put into Miri, a small station on the coast of Sarawak. It is here that the oil wells are and the tanks stand out as vivid patches of white against the jungle covering the hillside. On going ashore I met the Resident, and he seemed particularly anxious to get rid of the German ship, and I assumed that war was imminent, but did not know at that time it had actually been declared. The next night, as we were approaching Labuan, the electric light suddenly failed and the captain informed us that the dynamo was out of order, but would be working again in an hour's time. I then felt convinced that something was up and ordered the stewards to light the oil lamps in order that a distant lighthouse could see us passing. In about an hour and a half the lights were on again. I found out afterwards that the captain had an idea that H.M. survey ship *Merlin* had captured some German ships and was in Labuan Harbour; he therefore put out his lights and decided that if he saw any sign of these ships he would clear off to Sebang, in Manilla, a neutral port.

We came alongside the wharf at Labuan in the morning and commenced discharging cargo. Rice was eagerly bought by the dealers, and all stores had risen in price. It was here we heard that Great Britain and Germany were at war. The Resident informed Captain Mulliman that the ship would be detained, and the engines were dismantled. I tried hard to have the European members of the crew removed and placed under arrest, but at the moment the authorities were not anxious to take severe action. Having been amongst these people for a few

days I knew that they were hardly the sort to sit down and do nothing. The captain was furious at having fallen so easily into our hands. Having been a student in Germany and also with the Germans in South-west Africa I understood the language and overheard a good deal that had been said, and was of opinion that plans would be discussed. I was uneasy and stood in the alleyway that night, close to the officers' cabins, and a weary vigil was well rewarded by the conversation overheard. I was convinced that something was in the wind, but had nothing definite to go on until the next morning, when I heard the chief officer say: "Well, if we have to stay here for six months we might as well let the ship stay under water as on top, and at the same time we will spoil their wharf for a year or two." I immediately consulted Commander Jenkins, of the British North Borneo Co., and asked him if he would co-operate with me, as I was convinced that they intended to scuttle the ship.

The Resident provided us with ten Sikhs and we placed all the officers under arrest. We cleared out the firemen in order that they could do no damage, and Mr. R., of the S.W.D., informed us that he found all the sea-cocks open, which meant that the ship would have sunk in a short time.

Eventually these prisoners of war were removed to Singapore, and the *Sandakan* was also brought to that port and there sold by the Prize Court.

SERGEANT-MAJOR A. J. Warburton.

To be awarded the "Medaille Militaire" is considered a very great honour by Frenchmen, for it has on its reverse side "Valeur et Discipline," and in the French Army is only allowed to be worn by either a general or a private.

For a medal of this class to be awarded to a member of the British Army Service means great honour for the recipient and to the corps to which he belongs. The Army Veterinary Corps may well feel proud that one of its members has been selected, and the choice of Sergeant-Major Warburton is undoubtedly a popular one.

Born at Worksop in 1879, he enlisted in the 7th Dragoon Guards in 1901, and transferred three years later to the Army

Veterinary Corps, with whom he has remained ever since; previously he had seen active service during the South African War with the Sherwood Foresters. Promoted to the rank of Sergeant in 1904 whilst on service in South Africa, his rise to the rank of warrant officer took place temporarily in November, 1914, and was permanently confirmed shortly afterwards.

Amongst other appointments held whilst a staff-sergeant was that of instructor to the Royal Veterinary College of Ireland



SERGEANT-MAJOR WARBURTON, A.V.C.,
British Expeditionary Force, France.

Contingent Officers' Training Corps from May, 1911, to December, 1912, and as such his unfailing courtesy and attention to discipline will make his new honour doubly welcomed by those graduates who happened to be military students during that period. At the present time he is the Sergeant-Major of No. 5 Veterinary Hospital with the British Expeditionary Force in France, and as such is equally popular with officers and men.

Our wish is that this honour may be the precursor of many others to come.

The medal, which has a very handsome setting of laurel-wreath pattern in silver, has a gold scroll above it, and on the obverse side is the head of Liberty surrounded by the words, "République Française" in blue enamel, and on the reverse "Valeur et Discipline." The broad ribbon by which it is suspended is of golden yellow with a bright green stripe on either side.

THE LIFTING EFFECT OF A SHELL EXPLOSION.

By SERGEANT HUTCHIENS.

Mobile Section, Army Veterinary Corps, British Expeditionary Force, France

IN February last, whilst on mobile section duty, I was detailed for patrol work in the actual firing line, and whilst there I saw a shell hit a French transport horse full in the ribs. The animal was at the time standing in a field under a wall resting, and the force of the explosion cut the body completely in half, lifting the fore part over the wall, which was about six feet high.

A RESULT OF SHELL-FIRE.

By SERGEANT GOLDSMITH.

Mobile Section, Army Veterinary Corps, British Expeditionary Force, France.

ONE morning in the latter part of October, after a fairly heavy night's shelling, I was sent a few fields away from our camp to collect some wounded horses.

One of the large German shells had fallen in the camping ground of a troop of cavalry and had killed eight and wounded twenty-nine others. One horse had galloped about 200 yards away before falling.

The force of the explosion had severed one horse's head completely from its body and completely lodged it into another one's side, the fractured ribs being plainly visible. There were no other wounds to be seen on either of these animals.

VETERINARY SCIENCE: NEW EDINBURGH
COLLEGE.

AN APPEAL FOR FUNDS.

IN 1823 the Edinburgh Veterinary College was founded by the late William Dick—the oldest institution of its kind in Scotland, now known as the Royal (Dick) Veterinary College—and throughout its long career it has played a great part in the development of veterinary science, having sent out some 5,000 fully qualified surgeons, who have gone to all parts of the world. In 1899 a crisis occurred in the history of the College, situated in Clyde Street, Edinburgh, but, thanks to the kind offices of some well-wishers of the institution, it was saved from extinction, and an arrangement was then made with the trustees that the management should be taken over by an independent board of representatives. Shortly afterwards the College became incorporated by Act of Parliament, and the University opened its doors to students of the College by establishing degrees in veterinary science. The old College buildings in Clyde Street were inadequate and out of date, and it was clear that improved provision for teaching was essential if the College was not to be handicapped in the development of the training of students along the lines of modern research. Following considerable negotiations, an appropriate site, extending to $1\frac{1}{2}$ acres, for a new suite of buildings was decided upon at Summerhall, on the south side of the city at the east end of the Meadows. The memorial stone was laid by the Marquis of Linlithgow in July, 1914. A grant towards the site and buildings equal to about half the cost was promised, leaving the remainder to be raised by the board of the College. The total cost was originally estimated at £50,000, but owing to the increases in material and wages caused by the War the cost will now be about £68,000. The College is well advanced in construction, but to allow of entry and the work to be begun on a limited scale a sum of £12,000 is required, and an appeal is accordingly made to all interested in the advancement of veterinary teaching and practice and all lovers of animals to assist in raising this sum.

DESCRIPTION OF THE BUILDINGS.

The front presents a substantial and dignified appearance. The main entrance leads into a hall, about which the rooms of

the administrative department are grouped. To the right and left are arranged laboratories and classrooms, which, together with the front block enclose three sides of the quadrangle. The central part of the front block contains a hall for special academic meetings, approached by the main stair. It will give seating accommodation for 260. The fourth or east side of the quadrangle is formed by the clinical block, which has a separate entrance from Summerhall Square. The clinical block will form a model hospital for animals, being provided with operating and dressing rooms, pharmacy, and administrative offices, in addition to accommodation for all classes of animals. In connection with each department ample laboratory accommodation has been provided for research into animal diseases. The board of management have reluctantly decided that much of the projected work will require to be left in an unfinished state in the meantime, and that only such work as is essential can be proceeded with. A considerable number of rooms are being left in an incomplete state, and attention is being confined to such laboratories and classrooms as are absolutely necessary in order that teaching work may be carried on.

At no time in the history of this country has the importance of veterinary science been more apparent than it is at the present moment. In the interests of public health and to conserve the agricultural wealth of the country it is essential that a constant stream of veterinary surgeons should be furnished for civilian appointments and practice. The present War, moreover, demonstrates the urgent need for more men in the Army Veterinary Corps. The War Office has been compelled to appeal to the civilian practitioner, and the appeal has met with a response which threatens to thin the civilian ranks of the profession beyond the limits of efficiency. The output of veterinary graduates must therefore increase, or the country will suffer.

Subscriptions should be intimated or sent to the Treasurer, Mr. F. P. Milligan, W.S., 2, Albyn Place, Edinburgh, and will be duly acknowledged.

ARMY VETERINARY SERVICE.

ARMY VETERINARY CORPS.

TEMPORARY Lieutenant R. Isherwood to be temporary Captain. J. W. Hopkin to be Lieutenant. Lieutenant H. E. Powell to be Captain. Temporary Lieutenants to be temporary Captains: H. A. Idenden, J. E. Porrett, T. A. I. Anderson, A. Burnfield, W. G. Green.

SUPPLEMENTARY TO REGULAR UNITS OR CORPS,

ARMY VETERINARY CORPS.

The surname of Lieutenant D. Blyth is as now described and not as stated in *Gazette* of October 1, 1914.

Temporary Lieutenants to be temporary Captains: W. B. De Vine, J. Bradley, T. H. Tranter, J. Daunt to be temporary Quartermaster, with honorary rank of Lieutenant.

C. M. McNeill to be temporary Lieutenant, J. King to be temporary Quartermaster, with honorary rank of Lieutenant.

Temporary Lieutenants to be temporary Captains: A. F. Dykes, J. Millward, G. H. Butcher, F. R. Adams, J. Blackburn. Temporary Lieutenant J. Sherley relinquishes his commission.

J. McGregor to be Lieutenant.

To be temporary Lieutenants: J. B. Idle, A. E. Brandon, L. Barnard.

Captain P. W. Dayer-Smith to be temporary Major; the date of appointment of Lieutenant E. Child is September 27, and not as stated in *Gazette* of October 4; F. W. Somers to be Lieutenant.

E. H. Morton to be temporary Quartermaster, with honorary rank of Lieutenant.

Temporary Lieutenant S. R. Tufts to be temporary Captain.

Veterinary Major W. A. Pallin, F.R.C.V.S., from Royal Horse Guards, to be Major. Lieutenant R. T. Smith, from S.R., to be Lieutenant. Temporary Lieutenants to be temporary Captains: W. Brown, T. G. S. Bogue. Temporary Lieutenant J. W. Reynolds relinquishes his commission.

H. Tweedley to be temporary Lieutenant; Temporary Quartermaster and Hon. Lieutenant J. W. Higgins, from A.S.C., to be temporary Quartermaster; F. Cranfield to be temporary Quartermaster, with honorary rank of Lieutenant.

Reviews.

Report of the Veterinary Director-General, Department of Agriculture, Canada, for the Year ending March 31, 1914.

Printed by J. de L. Pache, Ottawa. Price 15 cents.

Mr. F. Torrance, the Chief of the Veterinary Staff, is to be congratulated on the production of a very comprehensive and instructive report of veterinary activities in the Dominion. 12,430 horses were tested for glanders with mallein, and 349 reacted and were destroyed. The slaughtering method of dealing with hog cholera is still adopted in Canada, and notwithstanding its proximity to the States, where the inoculation system is largely in force and favourably looked on, the Director-General does not favour the immunizing procedure and considers that it makes the disease more widespread. 9,900 hogs were slaughtered in 1914 as being diseased or in-contacts. Diurine was prevalent in Alberta and quarantine restrictions were imposed and 459 animals were slaughtered. Rabies and sheep scab occurred in two provinces respectively, but neither outbreak was extensive.

The Report calls attention to the prevalence of tuberculosis in hogs and this coincides with the noted extent of the disease recently observed among swine, both in this country and the States.

There were few outbreaks of anthrax, but the disbursement of vaccine for black-leg was greater than in any previous year, 38,871 doses being distributed.

Mr. C. H. Higgins, D.V.S., was in charge of the Pathological and Biological Laboratory at Ottawa and has done an immense amount of valuable work.

Some interesting papers and illustrations appear in the Report and the field of research has in many cases been busily explored. Huge domains have to be guarded and controlled by veterinary activity and nothing but praise can be given to the efforts put forth by the Canadian Department of Agriculture in these directions.

The Horse in Health and Disease. A text-book pertaining to veterinary science for agricultural students. By F. B. Hadley, D.V.M., Professor of Veterinary Science in the University of Wisconsin. Illustrated. Cloth: 6s. 6d. net. Published by W. B. Saunders Co., Philadelphia and London. 1915.

This book is intended to impart knowledge of veterinary science to the agricultural student, but we think that the learner will have to be well acquainted with the elemental facts of animal structure and disease before he can study it with profit. As a primer for the agricultural student it will be above him. As a book for an uninitiated man to plunge into at once we do

not recommend it as very digestible, and to the simple person who does, acquisition of "the little knowledge which is a dangerous thing" is likely to result. It is useless putting lessons on anatomy, physiology and disease before people who have not previously had experience in the care of animals in health and sickness. We do not hold with the order and importance of the subjects in the text. We think that any volume for agricultural students ought primarily to deal with matters of hygiene, feeding, and nursing and then perhaps give first-time instruction in animal structure, organic functions, and disease. To know how to prevent colic is far more important to farmers and horse-owners than to be acquainted with the virtues of turpentine or tincture of opium, or to be able to dabble in controversy with the attendant veterinarian on matters of physiology and disease.

The book is divided into two main portions, the first part dealing with the anatomy and physiology of the horse, and the second with the common diseases of this animal. As much information as is necessary is well compressed into the various sections of the two parts. The matter is concise and the reading instructive. We do not agree with several of the author's conclusions, and certainly cannot make the two following statements square with each other: "Every horseman should be able to recognize the more common diseases," and as the more common diseases are proportionately the more largely present, why should the horseman be cleverer than the veterinarian of whom it is written: "Even an experienced diagnostician fails to make an absolutely correct diagnosis in more than 50 per cent. of his cases." We think plantar neurotomy is contra-indicated in cases of navicular disease, but the author recommends it. Blistering and firing is condemned for side-bone. We have old patients working serviceably and well on hard stones to-day that have been going for over three years after having been fired and blistered for side-bone lameness, but this is a part of the world where horses are shod with heels and toe pieces. The illustrations in the book are quite a good feature, and its binding and get-up are excellent. G. M.

A Text-book of Veterinary Pathology for Students and Practitioners. By A. T. Kinsley, M.Sc., D.V.S., Pathologist, Kansas City Veterinary College. Second edition revised and enlarged with 194 illustrations, 5 inserts, and 1 plate. Published by Alexander Eger, Chicago, 1915.

This is a well-bound and well-printed book of 390 pages on the main pathological facts and conditions which the practitioner encounters in the course of his daily avocation. It is a volume that should appeal no less to the medical man than the veterinary surgeon. At a time when workers in the field of animal pathology are not entirely limited to those who have the most experience in that direction, it may act as a corrective and guide. Whilst by no means covering the whole extent of the science of animal diseases, it is a valuable text-book for the man who wishes to

obtain a knowledge which is essential to practitioners and students of medicine. It reminds us very much of the notes we took in lectures on pathology in days gone by, and we think that those who read, mark, learn, and digest the contents of its pages will have a good groundwork for further advance in the recognition and investigation of diseased conditions in animals and will have no difficulty in passing a professional examination on the subject. Hitherto our pathology has had to be dug for, and to a large extent has appeared to us to be second-hand; but this book puts valuable information, with which we ought to be acquainted, plainly and accessibly before us. If we have any fault to find with it, it is that it makes no authoritative pronouncement on not a few pathological conditions which we are constantly, though intermittently, knocking up against, such as braxy, Hodgkin's disease, louping ill, alopecia, scrapie, and some other plain diseases which appear to us in strange forms clinically, but which we are too obtuse to fathom or recognize.

Starting with the cell and passing on to a general consideration of disease, immunity (a particularly interesting chapter) and malformations, one phase of pathology is discussed. Circulatory disturbances, inflammation, progressive tissue changes, retrogressive tissue changes and necrosis and death, are next dealt with. Then comes a well-written chapter on the chief tumours our patients at times exhibit. Fever and infective granulomata are next dealt with, and the book concludes with one of the most useful little glossaries (in which technical terms are analysed and explained) it has ever been our lot to con. In reading through the book one statement in connection with tuberculosis attracted our attention. It is written that "2 per cent. is the estimated prevalence in the United States of tuberculosis among swine. Porcine tuberculosis is apparently on the increase." This would seem to correspond with the state of affairs in this country, where the frequency of tuberculosis in swine has recently been noted by the Board of Agriculture officials. From Canada, too, reports of the prevalence of tuberculosis in swine are to hand.

This text-book is worthy of commendation and recommendation, and inasmuch as it is concise and unique of its kind and furnishes easily accessible information on most pathological conditions, it deserves a wide circulation among all veterinarians and medical men.

G. M.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editors.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.

INDEX.

- Abdominal Case, 222
 Abscess, Development of Cyst into an, 188
 Agalactia and its Treatment in Cows, 342
 American account of the War-horse Business, 501
 Anaesthesia, Unusual Sequel of Chloroform, 500
 Anaesthetics, Administration to Animals of Respiratory, 470
 Anglo-Franco-Belgian Veterinary Relief Fund, 512
 Animals, Respiratory Anaesthesia of, 164
 Anorexia, Persistent, 440
 Anthrax in Elephants, 522
 Aorta, Perforation of the, in a Hound, 384
 Arecolin, Use of, in the Horse, 76
 Army Horse Supply, 575
 „ Mares, Sale of, 452
 „ The Mule in the, 132
 „ Veterinary Corps, 345, 375, 611
 „ „ Service, 441, 505, 561
 Artillery Horse, The, 452
 Atlas, Fracture of the, in a Toy Pom, 380; *illustration*, p. 488.
 Beef Inspection, 292
 BIOGRAPHICAL NOTICES :—
 Anderson, Capt. A. E., 351
 Brownless, Lieut. J. W., 352
 Ehrlich, Paul, 454
 Fox, Lieutenant, 351
 Holmes, J. Edgar D. (with portrait), 247
 Jones, Lieut. Brainsby, 352
 McCall, Principal James, 563
 Smith, Sidney (with portrait), 157
 Stevenson, The late Captain, *facing* p. 457
 „ Life History, 504
 Birth, A Premature, 554
 „ Premature and Normal in the Cow, 557
 Bitch, Vaginal Tumour in a, 79
 Blackburn, Municipal Veterinary Medicine in County Borough of, 92
 Board of Agriculture and Fisheries, Diseases of Animals Acts, 450, 506
 Board of Agriculture and Fisheries, 228
 Board of Agriculture and Fisheries, Continent, Animal Diseases on the, 451
 Board of Agriculture and Fisheries, *Journal of the*, 295, 347
 Bots, Perforation of Duodenum, 400
 Bovine Tubercle Bacillus, Infection of Children with, 5
 Bowel Case, A Peculiar, 330
 Breeding, Light Horse, 160
 British Guiana, Veterinary matters in, 80
 Bullet, The Course of a Shrapnel, 215
 Bursati, Conclusions on, 591
 Cæcum, Mammalian, 362
 Calcutta, Septicæmia in Pheasants at, 37
 Canine Filariasis, 40
 Canker, 341
 Cannon Bones of Shire and Thoroughbred Horses, 319
 Cattle and Sheep, Distomatosis or Liver Fluke in, 176
 „ Lives of Fluke or Distomatosis in, 176
 „ Mortality Amongst, in New South Wales, 62
 „ Tick : Its Effect on Milk Production, 409
 Ceylon, Government Veterinary Surgeon's Report, 400
 Children, Infection of, with Bovine Tubercle Bacillus, 5
 Chloral Hydrate Injections for Anaesthesia, 344
 „ Hydrate Narcosis in Horses, 45
 Cholera, Hog, and the Veterinarian, 513
 Cinderella of the Service, 460
 Circular Resection of the Trachea, 50
 Clinical Cases (Mostly Unsatisfactory), 219, 268
 Coccidiosis in Game Birds and Poultry, 115
 College, Royal, of Veterinary Surgeons, 558
 Constipation and Toxic Enteritis in a Dog, 186
 Contagious Ophthalmia, 28
 Coronitis in the Horse, 215
 Cow, Acorn Poisoning in a, 31
 „ and Horse, Soda Poisoning in the, 293
 „ Papillomatous Cysts in a, 226
 „ Poisoning by Acorns, 31
 „ Premature and Normal Birth in the, 557
 „ Retained Placenta in the, 531
 Cows, Agalactia and its Treatment in, 342
 „ Milk Fever in, 579
 Cryptorchid, Strongylus Armetus Worm in the Testicle of a, 329
 Cyst, Development of, into an Abscess, 188
 Defence of Government Horse Breeding, 177

- Diagnosis of Foot-and-mouth Disease, 256
 „ of Glanders, Ophthalmic Mallein for, 204
 Diagnostic, Stomach Tube as a, 447
 Diarrhoea in the Horse, Vaccine Treatment, 440
 Diary Extracts, Mobilization till Retirement, 272
 „ of a Veterinary Officer in France, 444
 Diseases in Cattle in North-west Rhodesia, 583
 Distemper, Sodium Hyposulphite in, 101
 Distomatosis in Sheep and Cattle, 176
 „ or Liver Fluke in Cattle and Sheep, 176
 Dog, A Case of Articular Rheumatism in the, 188
 „ Cases, 271
 „ Disease of the Liver in a, 387
 „ Faecal Stasis in the, 401
 „ Follicular Mange in the, 343
 „ Hydatid Disease in a, 437
 „ Intestinal Obstruction in, 490
 „ Oesophageal Obstruction in a, 78
 „ Sarcoma on Inside Cheek of, 551
 „ The Ambulance, 86
 Duodenum with Bots, Perforation of, 490
 Echinococcus Cysts in a Horse with Tuberculosis, 480
 Edinburgh College, New, 600
 EDITORIAL :—
 Agriculture and the Veterinary Profession, 406
 Army Veterinary Service, 100
 Cautious, The Importance of being, 1
 Clinical Work, Certified, 201
 Ethics and Success in Practice, 57
 Foot-and-mouth Disease, 3
 France, Roumanian Homage to, 250
 Hurry? What's Your, 500
 Ignoring of the Veterinary Profession, 159
 Literature and Literary Ability, 457
 Moore, Brigadier-General, Director of Veterinary Services, 55
 On Encouragement, 353
 Operators and Operations, 105
 Polyvalent Serum for Wounds, 407
 Serum, Polyvalent for Wounds, 407
 EDITORIAL (continued) :—
 Thought, 248
 Versatility, 200
 Wounds, Polyvalent Serum for, 405
 Elephants, Anthrax in, 522
 Ephemeral Fever, or Three Days' Sickness in Cattle, 126
 Eversion of the Rectum and Vagina in a Sow, 333
 „ of the Uterus, 375
 "Evil" in Sheep, Autogenous Vaccine Treatment, 430
 Evolution of the Horse, 251
 Extracts from Letter of Veterinary Officer on Active Service, 141
 Extremities of Cattle Fractures, 99
 Faecal Stasis in the Dog, 401
 Fever, Aphthous, and the War, 101
 Flies, Measures for Prevention of, 585
 „ Repellents for Protecting Animals from, 326
 Food for Thought, 60
 Foot-and-mouth Disease, 108
 „ „ Diagnosis of, 256
 Foot Cases, Use of Iodine in, 136
 Fowl, Studies of the, 566
 Fractures of Extremities of Cattle, 99
 France, Extract from Letter of Officer in, 82
 French Dogs of War, 301
 „ Military Veterinary Service, 196
 Game Birds and Poultry, Coccidiosis in, 115
 German Army Horses, Wounds in, 151
 „ Ship, Capture of a, 604
 „ Veterinary Surgeon, Military Experiences of a, 475
 Glanders, Diagnosis of, 204
 „ Method of Mallein Testing for, 355
 Goat with an Artificial Leg, 332
 Goats and Horses, Poisoning by Taxus Baccata in, 557
 Gunshot Wounds, 603
 „ „ Prevention of Sepsis in, 483
 Hæmaturia in Cattle, 503
 Hæmorrhage of the Stomach of American Bison, 140
 Hernia, Operation for Perineal, 42
 „ Peritonitis and Death, 27
 Hog Cholera and the Veterinarian, 513
 „ Cholera in the, 600

- Horse and Cow, Soda Poisoning in the, 203
Horse Breeding, a Defence of Government, 177
,, Points of a Cavalry, 91
,, Purulent Discharge and Swelling of the Eyelids, 211
,, Specific Corionitis in the, 215
,, Supply of the Army, 575
,, The Artillery, 452
,, Tuberculosis in a, 26
,, Tuberculosis with Echinococcus Cysts in a, 480
,, Vaccine Treatment for Diarrhoea in the, 440
Horses and Goats, Poisoning by Taxus Baccata, 557
,, On Roaring in, 403
,, Roaring in, 77, 403
,, Strangles in, 133
Hound, Perforation of the Aorta in a, 384
Hunting Memorial Fund, 297
Hurry? What's Your, 500
Hydatid Disease in a Dog, 437
Impaction of Pylorus and Bowels in the Dog, 78
Infective Granulomata, Report of Kennel Club on, 53
Inoculation against Swine Fever, 36
Inspection of Carcasses of Tuberculous Animals, 424
Intestinal Obstruction in a Dog, 490
,, ,, Use of Liquid Paraffin, 44
Italy, A New Veterinary School in, 190
Lamb, A Disease of the Unborn, 33
Lameness after Picked-up Nails, 138
Laminitis, Parturient, treated with Autogenous Vaccines, 370
,, Value of Reading, &c., 75
Light Horse Breeding, Thoughts on, 160
Literature and Literary Ability, 457
Liver, Bacillary Necrosis of, 33
,, Disease of the, in a Dog, 387
,, Fluke or Distomatosis in Sheep and Cattle, 176
Livestock and Feeding Stuffs, 98
Lockjaw, 512
Lymphangitis in a Horse, Suppuration following, 261
Mange, Follicular, in the Dog, 343
,, Tray (with illustration), 298
Mare, Peculiar Case of a, 185
Mares, Sale of Army, 452
Mating Results and their Teaching, 49
Maxilla, Fracture of the Inferior, 597
Military Experiences of a German Veterinary Surgeon, 475
Milk Fever in Cows, 579
,, Production, The Effect of Cattle Tick on, 400
Mobile Veterinary Section, Instructions for a, 288
Multiplicity of Cases, 267
Municipal Veterinary Medicine, 92
Muscular Rheumatism in the Horse, 402
Nails, Lameness after Picked-up, 138
Necrosis of Liver, Bacillary, 33
New South Wales, Mortality amongst Cattle in, 62
North-West Rhodesia, Cattle Diseases in, 583
OBITUARY :—
Brownless, John W., 404
Ehrlich, Paul, 454
Fenton, Veterinary-Major Gerald, 562
Jones, William Henry, 562
Marshall, Albert, 456
Sanders, Robert, 456
Sanderson, Harold, 456
Stevenson, Captain M., 504
Storie, Captain John 562
Thompson, G. A., 456
Wartnaby, George, 456
Observations among German Horses about Verdun, 350
Obstruction, (Esophageal, in a Dog 78
,, of Nasal Orifice. Operation for Relieving, 43
,, Use of Liquid Paraffin in Intestinal, 44
(Esophageal Obstruction in a Dog, 78
Open Joints, 180
Ophthalmia, Contagious, 28
Ophthalmic Mallein for Diagnosis of Glanders, 204
Oxygen as a treatment for Tetanus, 314
Papillomatous Cystitis in a Cow, 226
Paraffin, Uses of Liquid, 44
Paralysis, Senile, 448
Parasites and their Poisons, 580
Parliamentary—Swine Fever, 482
Parturition Case, 30
,, Notes incidental to, 223
Penis in a Pony, Epithelioma of the, 597
Peritonitis, Ventral Hernia, 27
Persistent Anorexia, 449

PHOTOGRAPHS :

- Aisne, Barn on the, 281
 " Dug-outs on the, 281
 " Horses under Shelter on the, 277
 Ambulance, Placing a Wounded Horse in a, 471
 Anthrax Bacilli, 520
 " in Elephants, 527
 " Pustules on the Fore-arm, 265
 Army Farriers at Work, 87
 " Veterinary Corps' Veterinary Camp, 443
 " Veterinary Corps' Veterinary Hospital, 442
 " Veterinary Corps' Veterinary Hospital, Fire Protection, 443
 Bacterium Tuberculosis, 546
 Brownless, Lieut. J. W., *facing* 353
 Bursati of Fetlock and Pastern, 591
 Canadian Veterinarians Enlisted for War, 85
 Chick, Dissected Organs of a, 567
 Chick just Hatched, 566
 Chloroformed Horse, Administering Restorative to, 472
 Chorionic Tufts, 530
 Cow Infested with Ticks, 415
 Cow's Bladder, showing Internal Aspect, 227
 Filarial Embryos, 41
 Fracture of the Atlas in a Toy Pom, 488
 France, With the Croix Violette, 471
 German Prisoners Captured on the Marne, 279
 Glandered Horse, 336
 Goat with Artificial Leg, 332
 Hartley, The late Mr. Charles, *facing* 405
 Holmes, Lieut.-Col. J. E. D., *facing* 247
 Horse, Distinct Purulent Discharge in a, 209
 " Example of "Atavism," 252
 " Seromucous Discharge with Purulent Flakes, 209
 " Swelling and Gluing together of both Lids from Purulent Discharge, 211
 Horse's Body found in a Tree, 89
 " Head showing Atypical form of Bursati, 592
 Horses clothed for the Night in France, 336
 House Demolished at Ypres, 555
 "Jack Johnson" Result in the Waggon Line, 279

PHOTOGRAPHS (continued) :

- Liver, Diseased Patches in, 34
 " with E. Cysts, 438
 Lunch, A Jan, 475
 McCall, Principal James, *facing* 503
 Mare with Shell Wound, 214
 Mobile Veterinary Section, 81
 Mons, A Halt on Retreat from, 273
 " Retirement from, 555
 Moore, Brigadier-General, *facing* 55
 Operation, A Successful, 473
 " in Progress, 472, 473
 " on the Withers, 474
 Ox, Portion of the Tongue of a, affected with Foot-and-mouth Disease, 111
 Pig's Feet affected with Foot-and-mouth Disease, 109
 Poll Evil, Operation for, 474
 Royal (Dick) Veterinary College Contingent, 83
 Sections of Baby Chicks, 571
 Shire's Bone, Enlarged to Show Grain, 320
 Smith, Sidney, *facing* 157
 Spleen with E. Cysts, 438
 Stevenson, The late Captain M., *facing* 457
 " Life of, 504
 Tea-party at Soupir, on the Aisne, 556
 Thoroughbred's Bone Enlarged, 322
 Tongue of an Ox affected with Foot-and-mouth Disease, 113
 Tubercle in Liver of Fowl, 547
 " Pheasant, 545
 Tumour, Showing the Worm Penetrating the Anterior Portion of the, 385
 Umbilical Hernia in Baby Chick, 573
 Unshipping Horses at the Base, 471
 Uterus of Cow in Pregnancy, 537
 Veterinary Corps at Work at Home, 330
 View of Army Veterinary Camp, 337
 " of Army Veterinary Camp in France, 335, 300
 Warburton, Sergt.-Major, 606
 Ypres, My Dug-out at, 285
 Placenta, Retained, in the Cow, 531
 Poisoning by Taxus Baccata in Goats and Horses, 557
 " of a Cow by Acorns, 31
 Polyvalent Serum, Cases treated with, 432
 " Serum, Employment of, in Veterinary Medicine, 358

Polyvalent Serum for Dressing Wounds, 361
 Poultry Feeding, 494
 „ and Game Birds, Coccidiosis in, 115
 Practitioners' Observations, 134
 Profession, Agriculture and the Veterinary, 406
 Projectile Wounds, Treatment of, 302
 Putrefaction in Utero, 189
 Pylorus and Bowel Impaction in the Dog, 78

Rangoon Municipality Report, 496
 Rectum and Vagina, Eversion of the, in a Sow, 333
 Resection of the Trachea, 50
 Respiratory Anaesthetics, Administration to Animals, 479
 „ Anaesthesia of Animals, 164
 Result of Shell Fire, 608
 Results of Mating and their Teaching, 49

REVIEWS :—

“Anaesthesia and Narcosis of Animals and Birds,” by Hobday, 559
 “Anthrax Spores, Disinfection of Hides infected with,” by Tilley, 348
 “Bibby's Book on Milk,” 197
Board of Agriculture, Journal of the, 295, 347
 “Canadian Department of Agriculture Report,” 612
 “Canine Medicine and Surgery,” by Saunders, 206
 “Cattle Therapy,” by Steffen, 507
 “Diseases of Swine,” by Lynch, 154
 “General Therapeutics, Text-book of,” by Fröhner, 152
 “Horse in Health and Disease,” by Hadley, 612
 “Horse, Surgical Anatomy of the,” by Sharpe-Jones, 51
 “International Institute of Agriculture,” 198
 “Owners, Veterinary Notes for Horse,” by Captain Hayes, 508
 “Pathology for Students and Practitioners, Veterinary,” by Kinsley, 613
 “Posology and Therapeutics for Veterinary Students and Practitioners,” by Banham, 453
 “Report of the Chief Veterinary Officer for 1914,” 560
Royal Army Medical Corps' Journal, 102

REVIEWS (continued):—

“System of Veterinary Medicine by various writers,” edited by Wallis Hoare, 51
 Rheumatism in the Horse, 402
 Roaring due to a Tumour, 77
 „ in Horses, 493
 Royal College of Veterinary Surgeons' Examination, 158
 „ Field Artillery, Diary of a Veterinary Officer with the, 393
 Rupture, Stomach, not Fatal, 331
 Sarcoma inside Cheek of Dog, 551
 Senile Paralysis, 448
 Sepsis in Gunshot Wounds, Prevention of, 483
 Septicæmia in Pheasants at Calcutta, 37
 Serum, Cases treated with Polyvalent, 432
 „ Polyvalent, for Dressing Wounds, 361
 „ Treatment and Swine Fever, 459
 Service, The Cinderella of the, 460
 Sheep, Autogenous Vaccine treatment for “Evil” in, 439
 „ and Cattle, Liver Fluke or Distomatosis in, 176
 Shell Fire, A Result of, 608
 „ Wound, Peculiar, 214
 Specific Polyvalent Serum for Wounds, 361
 Stomach of American Bison, Hamorrhage of, 140
 Stomach Rupture, Not Fatal, 331
 „ Tube as a Diagnostic, 447
 Strangles in Horses, 133
 Strongyle, Blood-clot resembling a, 33
 Supply, Army Horse, 575
 Suppuration following Lymphangitis in a Horse, 261
 Swine Fever and the Serum Treatment, 459
 Taxus Baccata Poisoning in Goats and Horses, 557
 Terrier, Vegetative Endocarditis in a, 332
 Tetanus, Oxygen as a Treatment for, 314
 „ Treatment by Magnesium Sulphate, 47
 Thoroughbred Bone and Shire Bone, 317
 Thought, Food for, 60
 Three Days' Sickness or Ephemeral Fever in Cattle, 126
 Torsio Uteri, On the Treatment of, 495
 Toxic Enteritis and Constipation in a Dog, 186

Trachea, Resection of the, 50
 Transport Work, Hints on, 128
 Tuberculosis and Foot-and-mouth
 Disease, 504
 " in Pheasants, 544
 " with E. Cysts in a
 Horse, 480
 Tuberculous Animals, Inspection of
 Carcases of, 424
 Tumour with Hernia 25
 Tumours, 268
 " in a Horse, 268

Undiagnosed Disease, An, 551
 Uteri, On the Treatment of Torsio,
 495
 Utero, Putrefaction in, 189

Vaccine Therapy, Cases treated by,
 72
 " Treatment for "Evil" in
 Sheep, 439
 Vaccines, Cases treated by Auto-
 genous, 224

Vaccines, Parturient Laminitis
 treated with Autogenous, 370
 Vaginal Tumour in a Bitch, 70
 Vegetative Endocarditis in a Boston
 Terrier, 332
 Ventral Hernia and Peritonitis, 27
 Verdun, Observations among Ger-
 man Horses at, 350
 Victoria Benevolent Fund, 243

War and Aphthous Fever, 191
 " and the Profession, 194
 " and the Veterinary Profes-
 sion, 81
 " Horse Business, American
 Account of the, 501
 " Stock of Horses and Our
 Horse Breeding, 349
 Worm, *Strongylus Armatus* in
 Testicle of a Cryptorchid, 329
 Wound, Peculiar Shell, 214
 Wounds by Gunshot, 603
 " Polyvalent Serum for
 Dressing, 361
 " Projectile, Treatment of,
 302

INDEX OF AUTHORS.

Abram, Transport Work, Hints on,
 128
 Acheson, Sepsis in Gunshot
 Wounds, Prevention of, 483
 Alexander, Clinical Cases (Mostly
 Unsatisfactory), 219,
 268
 " Horse, Tumours in a,
 268
 Althouse, Stomach Rupture not
 Fatal, 331
 Armfield, Cattle Diseases in North-
 west Rhodesia, 583
 Bambauer, German Horses, Obser-
 vations among, about Verdun, 350
 Bossenberger, Putrefaction Utero,
 A Case of, 189
 Burndred, Food for Thought, 60
 Burghard, Wounds, Treatment of
 Projectile, 302
 Cave, Bacillary Necrosis of the
 Liver, 33
 Comber, Cholera in the Hog, 600
 Cooper, Curtice (with Woodward
 and Turner), Cattle Tick: Its
 Effect on Milk-Production, 409
 Cuvillier, Employment of Polyva-
 lent Serum in Veter-
 inary Medicine, 358
 " Polyvalent Serum, Cases
 treated with, 432

Danforth, Premature Birth, A, 554
 Eve, Acorn Poisoning in a Cow, 31
 Fantham, Coccidiosis in Poultry
 and Game Birds, 115
 Farholme, Cinderella of the Ser-
 vice, The, 460
 Fast, Sow, Eversion of the Rectum
 and Vagina in a, 333
 Frenkel, Poisoning by *Taxus Bae-*
 cata in Goats and Horses, 557
 Frost, Open Joints, 180
 Früs, Horses, Chloral Hydrate Nar-
 cosis in, 45
 Giovanoli (Translation), Cattle,
 Fractures of Extremities of, 99
 Goldsmith, Tuberculosis with
 Echinococcus Cysts
 in a Horse, 480
 " Shell Fire, A Result
 of, 608
 Graüt (Translation), Horse, Muscu-
 lar Rheumatism in the, 402
 Gupta, Anthrax in Elephants, 522
 Hansson, Inspection of Carcases of
 Tuberculous Animals, 424
 Henry, Mortality amongst Cattle in
 New South Wales, 62
 Hink, Results of Mating and their
 Teaching, 49

- Hoare, Tumour of the Umbilical Region with Hernia, 25
- Hobday, *Strongylus Armatus* Worm in the Testicle of a Cryptorchid, 329
- Holmes, Bursati, Conclusions on, 591
- Hornbaker, Government Horse-Breeding, A Defence of, 177
- Howitt, Tetanus, Injection of Oxygen as Treatment, 314
- Hutyrá, Swine Fever, Inoculation against, 36
- I. S. C. (Translation), Aphthous Fever and the War, 191
- Johns, Multiplicity of Cases, 267
- Jones, Tetanus, Oxygen as a Treatment for, 314
- Jordi, Torsio Uteri, On the Treatment of, 495
- Kaupp, Studies of the Fowl, 566
- Kennedy, Cattle, Ephemeral Fever or Three Days' Sickness in, 126
- Lawson, Stomach Tube as a Diagnostic, 447
- Leclainche, Wounds, Specific Polyvalent Serum for, 361
- Leishman, Treatment of Projectile Wounds, 302
- Lockhart, Bot's Perforation of Duodenum, 490
- MacCormack, Milk Fever in Cows, 579
- Mahon, Horse, Evolution of the, 251
- " Faecal Stasis in the Dog, 491
- " Parasites and their Poisons, 580
- " Specific Coronitis in the Horse, 215
- Marais, American Bison, Hemorrhage in the Stomach of, 140
- Mares, Trachea, Circular Resection of the, 50
- Marquet (Translation), Liquid Paraffin, Internal Use of, 44
- Mayall, Army Horse Supply, 575
- " Dog, Impaction of Pylorus and Bowels in the, 78
- " Dog, Toxic Enteritis and Constipation in the, 186
- " Laminitis, Value of Reading and a Moral, 75
- " Milk Fever in a Cow, 553
- " Supply of the Army Horse, 575
- " Tumour, Vaginal, in a Bitch, 79
- " Undiagnosed Disease, 551
- Merillat, Animals, Respiratory Anæsthesia of, 164
- " Gunshot Wounds, 603
- Mitchell, Infection of Children with the Bovine Tubercle Bacillus, 5
- Mitra and Ganguly, Canine Filariasis, 40
- Mitter, Ophthalmia, Contagious, 28
- Mohler and Eichhorn, Glanders, Ophthalmic Mallein for Diagnosis of, 204
- Nichita, Anæsthesia, with Injections of Chloral Hydrate, 344
- Parker, Dog, Oesophageal Obstruction in a, 78
- " Horse, Use of Arecolin in the, 76
- Patrick, Ventral Hernia, Peritonitis and Death, 27
- Perkins, Tumour, Roaring due to a, 77
- Pollock, Observations of a Practitioner, 134
- Pratt, Shire Bone and Thoroughbred Bone, 317
- Rees-Mogg, Tuberculosis in a Horse, 26
- Reid, Cow, Papillomatous Cystitis in a, 226
- " Hydatid Disease in a Dog, 437
- Roberts, Dog Cases, Two, 271
- Röhler and Sserebrennikow, Severe Case of Articular Rheumatism in a Dog, 188
- Ross, Boston Terrier, Vegetative Endocarditis in an aged, 332
- " Intestinal Obstruction in a Dog, 490
- " Sarcoma inside Cheek of Dog, 551
- Rusticus, Abdominal Case, 222
- " Parturition, Notes Incidental to, 223
- Salvisberg, Cow and Horse, Soda Poisoning in the, 293
- " Premature and Normal Birth in the Cow, 557
- Sanitary Officer versus Measures for Prevention of Flies, 585
- Schantyr, Cyst, Development of, into an Abscess, 188
- Schwendimann, Lameness after Picked-up Nails, 138
- Scott, Parturient Laminitis treated with Autogenous Vaccines, 379
- Slavu, Follicular Mange in the Dog, 343

- Smith and Mitter, Pheasants, Septicæmia at Calcutta in, 37
- Stapley, Mammalian Cæcum, 362
- Stokes, Ganker, 341
- Steevenson, Iodine, Use of, in Foot Cases, 136
- Steffen, Agalactia and its treatment in Cows, 342
- „ Persistent Anorexia, 440
- „ Senile Paralysis, 448
- „ Uterus, Eversion of the, 375
- Sullivan, Bowel Case, A Peculiar, 330
- Sutton, Fracture of the Atlas in a Toy Pom, 380; *illustration*, p. 488
- Taylor, Blood Clot resembling a Strongyle, 33
- „ Chloroform Anæsthesia, Unusual Sequel, 599
- „ Inferior Maxilla, Fracture of the, 597
- „ Perineal Hernia, Operation for, 42
- Tepazz, Sodium Hyposulphite in Distemper, 101
- Tirumurti, Disease of the Liver in a Hound, 387
- „ Perforation of the Aorta in a Hound, 384
- Trewin, Nasal Orifices, Operation for obstruction of, 43
- Turner (with Woodward and Cooper Curtice), Cattle Tick: Its Effect on Milk Production, 409
- Tutt, Autogenous Vaccines, Cases treated by, 224
- Tutt, Diarrhœa in the Horse, Vaccine treatment of, 440
- „ Epithelioma of the Penis in a Pony, 597
- „ Evil in Sheep, Autogenous Vaccine treatment, 439
- „ Horse, Suppuration following Lymphangitis, 261
- „ Mare, Peculiar Case of a, 185
- „ Strangles in Horses, Death after Apparent Recovery, 133
- „ Vaccine Therapy, Cases treated by, 72
- Udall, Foot-and-mouth Disease, Diagnosis of, 256
- Vallee, Polyvalent Serum for Dressing of Wounds, 361
- „ “Veterinary Officer,” German Ship Capture of a, 604
- Whitfield, Hog Cholera and the Veterinarian, 513
- Williams, Liver Fluke or Distomatosis in Sheep and Cattle, 176
- „ Retained Placenta in the Cow, 531
- Woodward (with Turner and Cooper Curtice), Cattle Tick: Its Effect on Milk Production, 409
- Wright, Treatment of Projectile Wounds, 302
- Wyly, Shell Wound, Peculiar, 214
- „ Shrapnel Bullet, The Course of a, 215

Indian Agricultural Research Institute (Pusa)
LIBRARY, NEW DELHI-110012

This book can be issued on or before

Return Date	Return Date